FEBRUARY 1955

VOLUME 4, NUMBER 2

Battelle Technical Review

IN THIS ISSUE:

Corrosion Studies Aid Light Metals

NUCLEAR ENGINEER

EUGENE M. SIMONS

The great accomplishments of the physicists have unlocked the secrets of the atom. But, the knowledge they have given us must be translated into practical forms that will enable us to exploit this new force. The task has been taken on by the nuclear engineers.

It is in this light that Eugene M. Simons sees his responsibilities. As a nuclear engineer, he knows the vast problems that must be solved—the improvement of reactor designs, reducing the process of energy production to more practical forms, and developing the new materials required to meet the demands of the tremendously hot and corroding environment in the reactor.

Like many nuclear engineers, Gene received his training in another field—in his case, friction, lubrication, and wear. After joining Battelle in 1943, he investigated such problems as the hydrodynamics of cyclically loaded bearings; shaft seals for high-speed, high-pressure use; precision measurements of bearing and shafts; and the development of precision techniques for producing test bearings of desired accuracy.

About 1950, Gene had the opportunity of entering the field of nuclear engineering. Since then, his time has been devoted to solving problems related to the development of aircraft reactors, making studies of the feasibility of novel reactor designs, and developing the all-important components for high-temperature reactors' liquid systems, including pumps, valves, seals, bearings, and instrumentation (for pressure, temperature, fluid flow, and liquid-level measurements).

Gene has written a dozen articles covering various aspects of his research in the fields of friction, lubrication, and wear, as well as atomic energy. His professional activities also include membership in the American Society of Mechanical Engineers and the Nuclear Engineering Division of the American Institute of Chemical Engineers.

His preparation for these activities began at Carnegie Institute of Technology, where he received his B.S. in mechanical engineering. Later, he received an M.S. from Virginia Polytechnic Institute and his Ph.D. from The Ohio State University.

When away from the Institute, Gene devotes much of his time to two hobbies. Of greatest interest are his children—twin boys and two daughters. His workshop supplies leisure-time relaxation and a means of maintaining his home.

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Pilot-Plant Realities

THE PILOT PLANT MIGHT BE described as the meeting ground for what has preceded it and what is to follow. It is the arena where the basic scientific accomplishments of the laboratory are scrutinized in the cold light of practical business management.

In the pilot-plant stage of research and development, a philosophy and tempo different from that of the laboratory prevails. Time suddenly is crucially short; every cent of investment must be justified. The "why" in question—which was very important to laboratory scientists—becomes secondary, while the "how" and "how much" grow dominant. The work from here on is conducted by engineers and technologists, who know they must produce results satisfactory to management and yet consistent with the scientific facts. These men practice an art different from that either of scientists or business managers. The problems that arise must be solved quickly and economically. Scientific elegance often takes a back seat to practical ingenuity. The proof of the pudding is in the eating of it, and the pilot plant represents a small but sufficient helping to permit judgment of what is and what is to come.

The engineers and technologists who operate pilot plants must be truly adroit. They must appreciate their dual roles. One ear must be tuned to the past, another to the future, and both eyes must be on the all-important here and now. Their actions must be guided by a philosophy of compromise, yet they dare not compromise the facts. In addition to possessing these peculiar requirements, they must be wise planners, good builders, and careful operators. And while their practice is versatile, their conclusions must be unequivocal and clear.

In the process industries, particularly chemical and metallurgical, the pilot plant long ago proved its worth. The investment required to erect and operate a commercial chemical or metallurgical plant is usually so large that the expensive pilot plant can easily be justified. And, in nearly all industries, the pilot plant is expensive. The facilities, equipment, and manpower needed are often elaborate and costly, and the time required to build and operate a pilot plant is large compared with that required in the usual laboratory investigation.

But given the space, the time, the facilities, and the money, the singular contribution of a well-integrated pilot-plant team still determines the ultimate success of the venture. It is this last ingredient, the well-integrated pilot-plant team, that may pose the most difficulties. Unless a company has a continuing series of pilot-plant operations, it may not be able to put together effective personnel within the time limits prescribed. Fortunately, however, an outside source of help is now being made available to industry. Battelle, recognizing the need, is offering the services of experienced and balanced pilot-plant teams whenever and wherever they are needed. Such teams, comprised of skilled technologists experienced in diverse fields and supplied with the necessary facilities, can effectively bridge the gap from laboratory to commercial plant.

Clyde Williams

President and Director, Battelle Memorial Institute

ORE CRUSHER

The large gyratory crusher is at work on uranium ore. The machine is used by Battelle's mineral processing laboratories for the preparation of large samples of all types of ores. A commercial crusher, it will reduce 4-inch chunks to ¼-inch size at the rate of 10 tons per hour.

Corrosion Studies Aid Light Metals

By carefully selecting their uses and making them corrosion resistant for specific applications, magnesium, aluminum, and titanium can be made more useful to many industries.

by FREDERICK W. FINK

MANY FACTORS HELP TO DETERMINE the usefulness of metals in our economy—cost, availability, weight, strength, and corrosion resistance are only a few. Of major consideration for many applications is a metal's resistance to corrosion. This is especially true for the light metals.

In the early days, the effective use of aluminum and magnesium was handicapped because little was known about their limitations and true potentialities. Both metals frequently failed because they were used improperly. The failures, in turn, tended to discourage their wider application. Their tendency to corrode when used in the forms then available was one of the major causes of failure of both aluminum and magnesium in the early years.

An important factor in the growth of the light metals is, of course, the ability of the industry to reduce production costs. In large part, our supply of the metals depends upon the availability of cheap energy, particularly electric power. Thus the ability of the electric power industry to reduce power costs and of the metallurgists to improve production techniques, which are not considered in this article, will play an important part in the future of aluminum, magnesium, and titanium.

Fred Fink has concentrated on corrosion problems since joining Battelle in 1938. He has guided investigations in such areas as protective coatings (including both metallic and organic materials), cathodic protection, and corrosion inhibitors. As a member of the Institute's division of physical chemistry and corrosion technology, he has been responsible also for corrosion studies associated with the development of aluminum, magnesium, and titanium alloys. Fink received the Naval Ordnance Award in recognition of his work on marine corrosion problems during World War II.

The lightness and strength of magnesium made it a promising metal for many purposes from its earliest development. Yet, its tendency to corrode appeared to belie its promise. In the early years of World War II, however, J. D. Hanawalt and his co-workers at the Dow Chemical Company discovered the importance of metal purity in preventing corrosion in magnesium alloys. They found, for example, that the presence of more than 0.005 per cent iron in the aluminum-zinc-magnesium alloy series increased the susceptibility to corrosion in sea water. They also discovered that nickel and copper impurities had a similar effect. The impurities, in the presence of sea water, are cathodic and cause the generation of an electric current which corrodes away the magnesium.

IMPROVEMENTS IN MAGNESIUM

Even a small increase in the amount of some impurities can have devastating effects. Thus, if the iron content of magnesium is increased from 0.005 to 0.05 per cent, the corrosion rate is increased from 30 to 100 times in salt water.

Sometimes the cathodic action of impurities can be prevented. Thus, investigation has shown that the addition of small amounts of manganese overcomes the effect of iron. The manganese tends to precipitate the iron in the melt when the alloy is cast; it also surrounds any residual iron, preventing it from acting as a cathodic impurity.

Early magnesium alloys had flux inclusions which tended to promote pitting when the metal was brought into contact with moisture. Improved melting practice has resulted in cleaner castings and has now eliminated this problem to a large extent. Improvements in degassing practice also have minimized the problem of microporosity in magnesium. For example, the use of chlorine as a degassing agent, which was devel-

oped during World War II, is still found helpful in eliminating hydrogen from the melt.

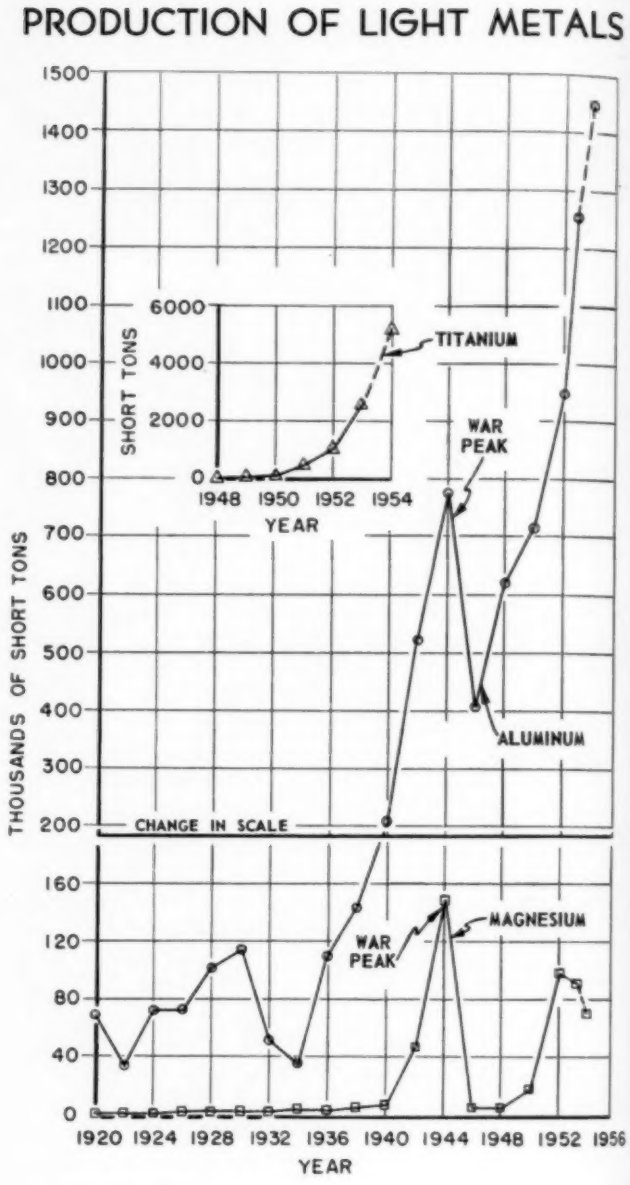
The development of new types of alloys has helped to extend the range of magnesium's usefulness. For example, an alloy with 11 per cent lithium has excellent corrosion resistance and less than usual sensitivity to impurities. It may find application in primary batteries and as a sacrificial anode for cathodic protection. The alloy's limited strength, however, prevents its use in aircraft construction. Other alloys with high strength have been developed, but they have poor corrosion resistance. Cladding of such alloys with the binary alloy tends to protect them against corrosion, but additional research is needed to make such high-strength alloys equally available for use in aircraft and other structures.

Growing Importance of Aluminum

Aluminum, because of its excellent resistance to corrosion as well as its strength, is the most widely used of the light metals. It is especially valuable in applications which call for outdoor exposure. For example, it has withstood atmospheres which contain sulfides, carbon dioxide, sulfur dioxide, traces of hydrochloric acid, and other contaminants. Attack by such atmospheric contaminants is usually slowed by the natural formation of a protective oxide film. The rate of weathering tends to decrease with the passage of time. This is explained by the fact that the pores in the oxide are gradually filled with stable corrosion products. Engineers need give little consideration to corrosion when selecting high-strength aluminum alloys for use in heavy structural installations. However, where it is to be exposed in the form of thin sheets, such as in aircraft, the alloys weather best when clad with pure aluminum.

Aluminum is corrosion resistant to pure water. Nevertheless, investigation has shown the danger of using aluminum piping in the ordinary potable water supply system; the presence of even traces of copper or iron in the water, for example, is known to promote corrosion of the aluminum. In cases where the water is circulated in a closed system, however, corrosion inhibitors can be added to prevent attack. Thus, 500 parts per million of sodium chromate added to a slightly alkaline buffered water will keep aluminum bright and free from attack.

Improvements in aluminum solders are also helping to expand the uses of the metal. Recent research has shown that zinc-base solders are corrosion resistant and may be satisfactory for use on aluminum automobile radiators. A new stannous chloride flux, which



is said to facilitate the soldering of aluminum, has been announced. Such developments may make it possible for aluminum to replace copper and brass for auto radiators.

Growing knowledge about the possible uses, as well as the limitations, of aluminum have helped to widen its acceptance. Thus, public confidence in aluminum and its alloys has been increased tremendously by continuing research and developments.

Titanium

Unlike magnesium and aluminum, titanium is a newcomer and has been under investigation for only a few years. Titanium research has been concentrated

largely on metallurgical and production problems of the pure metals, but the alloys have also received some attention. Much attention has been devoted also to a study of corrosion resistance.

In general, metallurgists have found that under certain conditions, titanium is one of the most corrosion-resistant commercial metals available. Thus, titanium has no equal among the common metals in its ability to resist the action of sea water. According to one recent estimate, the rate of attack in sea water would be only one mil in 1250 years. Titanium alloys designed for strength and hardness possess similar corrosion-resisting properties.

On the other hand, recent events indicate that titanium is subject to stress corrosion. Several companies have reported that stressed titanium alloys, subjected to red fuming nitric acid, have exploded suddenly after being disturbed in the solution. No adequate explanation for the mechanism is available. But in view of the fact that titanium containers have been used for red fuming nitric acid in rocket experimentation, an investigation of this stress corrosion problem is needed urgently.

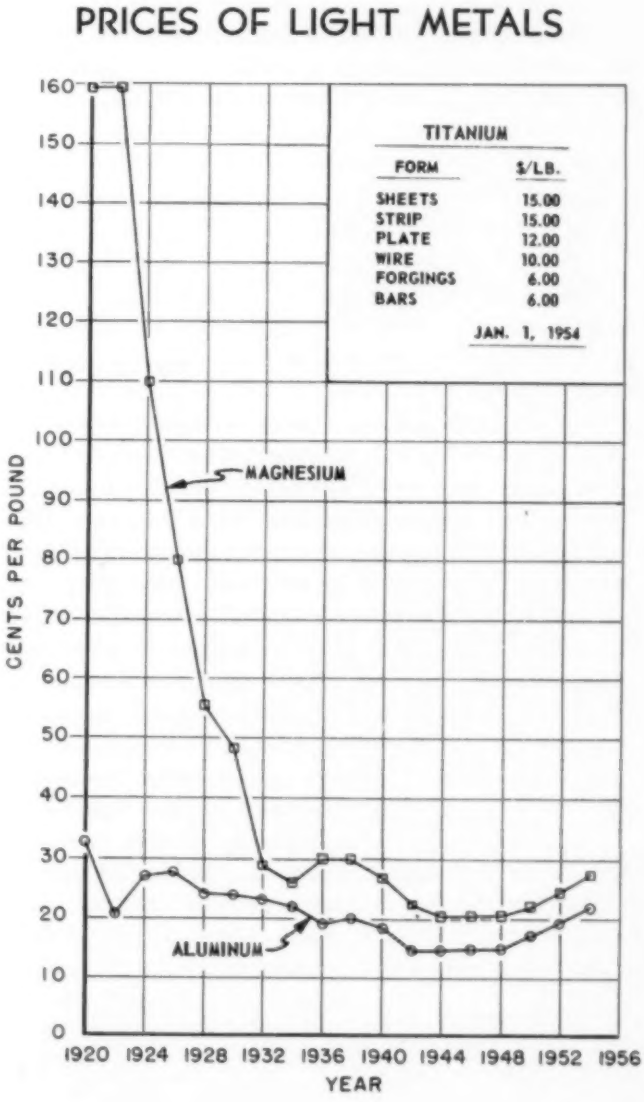
Because of its excellent corrosion and physical properties, metallurgists have estimated that titanium may be substituted for as much as 50 per cent of the stainless steel now in use in chemical plants. They pose the condition, however, that the cost of the titanium must be reduced to less than $3 per pound. If the price is lowered sufficiently, it will also compete with, but not replace, aluminum for some applications.

Areas for Future Research

Though aluminum and magnesium have come far in recent years, many problems, which are holding back the extension of their usage, remain to be solved. The metals could be put to many more uses if some of the corrosion problems were solved.

Developing a material resistant to attack by flue-gas condensate is an example of the potentialities of light-metal research. A recent investigation showed that aluminum-coated steel is resistant to attack by such condensate. Is aluminum alone resistant? Would aluminum pipe be suitable for such a purpose? An investigation would be necessary to find out. On the other hand, perhaps the use of ceramic-coated aluminum would solve the problem. Ceramic coating on steel inhibits corrosion by acid condensate, but such coated pipe sometimes fails at the pores. Perhaps aluminum, if more resistant, would not fail. The final answer would call for investigation of the resistance of aluminum to condensate, finding the best ceramic coating for aluminum, and a study of the effect of the condensate on the coated metal.

The growth in size of aircraft has created another serious corrosion problem. Previously, high-strength aluminum alloy sheets, suitably heat treated and cladded, served well in the exposed parts of planes. Now, however, the large sizes of sheet used in the construction of planes present difficulties in heat treatment. Since inadequate heat treatment reduces corrosion resistance, the metallurgist and corrosion technologist must decide what steps might best solve the problem. One possible approach is to modify the heat treatment so that the large sheets can be accommodated. An alternative is to substitute a more corrosion-resistant alloy or one for which heat treatment is less critical. Other possibilities may also present themselves.



Heat-exchanger applications for aluminum would be more widespread if some of the corrosion problems could be solved. Thus, the metal is used in nuclear power plants for handling high-purity water at elevated temperatures. Under some conditions, not thoroughly understood at present, aluminum fails by corrosion. Further research on this problem could greatly expand the possible uses of aluminum in heating equipment, automobile radiators, and similar applications.

For both magnesium and aluminum, corrosion is frequently localized at joints, seams, and contacts with other metals. Wider application of light alloys depends to a large extent upon the development of joints superior in corrosion resistance and strength to those now available.

Magnesium and its alloys would enjoy broader applications if the effects of purity and composition in corrosive environments were more thoroughly understood. With increased knowledge, magnesium might find uses under conditions of tropical humidity, where contact with foodstuffs is necessary, and where contact with body fluids is required. Availability of magnesium alloys for use in such environments would greatly broaden the demand for the metal.

The solution of corrosion problems would also speed up the development of titanium. Currently available commercial-grade titanium tends to vary considerably in purity from lot to lot. Determining if any of these variations adversely affect the corrosion properties of the metal would definitely aid in the advancement of titanium's technology.

Improved corrosion resistance would, of course, increase the conventional usages of the light metals. Engineers are devoting increasing attention to high-strength, lightweight designs for many devices that move, have to be lifted, or are used in transportation. For air transport, for example, greater speeds and higher fuel costs demand economies in the total cost of operation. The same factors operate in the fields of rail and automotive transportation. The light metals offer a most fruitful approach to this problem.

Granted that their technology holds a favorable course, it may be that aluminum, magnesium, and titanium will rank next to steel, possibly in that order, a quarter-century from now.

UNCERTAINTY FROM CERTAINTY

"Our knowledge of the early formative history of the earth is perhaps more insecure today than for many years past. We do not know for certain whether the earth began as a molten mass, spun off from the sun, slowly solidifying and losing heat through aeons of time, or whether it started its long history as a cold gaseous mass, attracting to itself meteoric particles and dust, not losing heat but gradually gaining it through self-compression . . .

"The tempo of new exploration and research is probably greater than ever before, and the work is no longer bound to dry land. Oceanic expeditions measure the physical character of the great deeps by seismic, gravitational, magnetic and heat-flow instruments. Natural earthquakes are recorded, and the velocities of their vibrations through and around the earth are analysed. Artificial earthquakes made by explosions are used in economic exploration and in scientific research. And laboratory work in high-pressure physics has added significantly to our stock of knowledge. From this great accumulation of facts, geological and geophysical, speculative deductions can be made about the nature of the earth's interior, but the final solution is a will o' the wisp, ever eluding us".

G. M. Lees in *The* (London) *Times Science Review*

High-Speed Machines for Business

High-speed data-processing machines offer businessmen opportunities for decreasing the cost and increasing the usefulness of business records.

by W. L. SWAGER

THE ERA OF HIGH-SPEED DATA-PROCESSING machines for use in business offices is at hand. These machines can perform all the normal clerical functions in any office: record, file, select from file, calculate, sort, summarize, and tabulate. Their speed and flexibility open up a whole new range of opportunities for alert, aggressive businessmen.

The first such machines, developed during World War II, were designed by scientists for scientific calculations. The scientists knew the problems to be solved, and were able to design equipment useful for handling those particular kinds of problems. From these early computers have evolved the high-speed data-handling systems available to business today.

Rapid technical strides have been made by engineers, mathematicians, and other scientists in developing these newer machines. However, technical men are no longer as well acquainted with the needs they are attempting to satisfy as they were in the early days. It is not surprising, therefore, that solutions to the problems of how best to use these devices in business have developed more slowly.

TECHNICAL AND BUSINESS KNOWLEDGE NEEDED

The task of matching the capabilities of a large data-handling system with the needs of an existing business office still requires both a clear technical knowledge of what machines can do and a sound appraisal of the information to be handled. It is a rare individual who has command of such combined knowledge—indeed, even effective teams are rare. Since scientists and engineers cannot be expected to know all the needs of our business systems, the responsibility for closing this gap falls primarily on the businessman. If he is going to influence the future development of data-handling machinery so that it more nearly meets his needs, he must begin now. And he must begin at home by examining and evaluating his specific informational needs, and by learning to describe these needs in terms the designer can understand and use.

Installing a satisfactory computer system in a business office requires plenty of hard work by all concerned—accountants, executives, systems analysts, and computer engineers. The effort is justified by the possibilities for cost reduction and better management control. The speed of modern data-handling machines allows management to consider, for example, many new ways to combine business records for better interdepartmental control. There are possibilities of summarizing sales, production, and other data in new ways; of bringing together more data as a basis for reports, yet organizing them thoroughly so that the reports are more meaningful. In short, there are possibilities of increasing the content and value, while decreasing the cost, of business records.

Since joining Battelle in 1948, William L. Swager has directed research on such problems as marketing, management audit and analysis, research and development planning, systems analysis, process cost evaluation, and plant location. Earlier, he had participated in pioneer work on military and industrial operations research. Swager is an active member of the Operations Research Society of America, the Institute of Management Sciences, the American Chemical Society, and American Institute of Chemical Engineers.

MEETING THE REQUIREMENTS

The questions posed in exploring such possibilities are at least as difficult to answer as they are easy to ask. Together, they lead to that involved process of "rethinking", of which so much has been heard lately:

WHEN and WHERE should information be available for maximum effectiveness?

WHAT type and form of records will best control each functional activity in the company?

Once answers to these difficult questions have been developed, then, and only then, can the question which is usually the first one asked, be given serious consideration:

HOW to go about meeting information requirements?

If the preliminaries have been thoughtfully carried out, the process of developing the best system will be made less difficult, but by no means simple. The cost of any satisfactory system of producing information must not exceed the dollar-and-cents value to management. Until this condition is met, both the information requirements and the system for producing information must be re-evaluated and modified until the most satisfactory balance is attained.

The problem of balancing the cost of obtaining and processing financial records with the value of such records to management is not new. Accountants are continually concerned with it. In practice, though, the task of estimating a dollar-and-cents value for various kinds of information is a perplexing one and has often been sidestepped. In the past, rough approximations have sufficed, or even a general agreement reached that "the information would be very useful".

Value of High-Speed Machines

With the introduction of high-speed data-processing equipment, the problem of placing a value on all kinds of information must be faced squarely. Properly used, high-speed electronic systems will provide business control information in its most useful form. Information will be reduced from a wider span of business details and will be available soon enough to be useful. Improperly used, electronic systems will simply lead to more information faster, and more confusion. Proper use requires sound business and technical judgment in preparing for the installation of an electronic data-handling system.

Forward-looking businessmen have a very real opportunity to make more profitable use of high-speed data-processing machines. The technical and business problems, however difficult they may seem, are not insurmountable. Electronic designers, mathematicians, systems analysts, and operations researchers stand ready to team up with businessmen in solving these problems. The effort expended in their solution will bring compensating rewards in terms of better management control and dollar savings.

"The skeptical and questioning approach of science has played a major part in freeing the United States from the authority of old tradition and protecting her from the fanaticism of new ideologies. The restless energy of the scientist and engineer has broken through the constraints of red tape and supplied a dynamic drive to the development of government programs, as well as to the productiveness of private industry."

Don K. Price in *Government and Science*

Notes From Battelle

EXPANDED LARGE-SCALE RESEARCH

TWO NEW BUILDINGS, the first units for Battelle's expanded program of pilot-plant and large-scale research in chemical engineering, metallurgy, and minerals processing, are ready for installation of equipment. The buildings, which total 13,000 square feet, are located on the Institute's new 400-acre site just outside Columbus (see architect's drawing inside back cover). Ample water, natural gas, and electric power are available to meet any foreseeable pilot-plant need. Additional buildings are contemplated and will be custom built to fill specific industry needs as they arise.

In addition to extensive chemical engineering equipment, a 500-kva, 3-phase transformer, equipped with automatic controls is to be installed. It can be used with a 1000-pound melting furnace or for studies of continuous smelting.

Much of the Institute's pilot-plant research will be guided by John W. Clegg, manager, department of chemical engineering; J. Harry Jackson, manager, department of metallurgy; and William H. Browne, manager, department of mechanical engineering.

The new construction at the West Jefferson site is in addition to the Institute's recently announced 1½-million-dollar program for the establishment of facilities for the study of peacetime applications of nuclear energy.

FUTURE FOR AMERICAN BUSINESS

THE MINOR UPS AND DOWNS of our economic system often tend to obscure the real potentialities of the economic growth of the United States. The plus factors for business expansion were recently discussed by Clyde Williams, president and director of Battelle, before the Third Annual Small Business Management Conference, which was held at The Ohio State University in Columbus.

The two main factors for the continued strength of business, according to Dr. Williams, are the healthy population growth of the country and the increasing application of science and technology to American business and industrial problems.

Population growth, now at the rate of 15 per cent every ten years, means that there will be 200 million Americans by 1975—an increase of 23 per cent. This alone would assure us an expanding domestic market.

The application of science and technology to industry since World War II has resulted in the creation of new products, expanded industrial activity, and increased employment. Evidence of the importance of research can be seen in the fact that the most research-minded businesses showed the largest growth. The country's gross national product more than doubled from 1939 to 1954, which means that our standard of living has increased about 75 per cent in the past 15 years. The existence of these factors are certain to continue the expansion of industrial activity.

OPENING OF GENEVA LABORATORY

THE PURPOSE OF research is to liberate man by reducing his labors, declared Monsieur Denis de Rougement, author and Director of the European Cultural Center, when he spoke during the formal opening of Battelle's Geneva Laboratory. He described research as a spiritual passion and urged that research institutes work in the creative spirit.

The 300 guests at the ceremony, who had previously been welcomed by Dr. Clyde Williams, president and director of the Institute, also heard Professor G. Colonnetti, President of the Italian National Research Council. He spoke of the benefits to be derived in future years from the peaceful applications of nuclear energy. He pointed out that the trouble with machines is not that they cause unemployment, but that men have been forced to serve them; in the future, however, there is hope that man may be freed from this physical drudgery. Professor Colonnetti concluded by expressing doubt as to the value of research if the results are applied without concern for their effect on society.

A third speaker, Professor L. Jacque, Professor of Chemistry at the Ecole Polytechnique in Paris, reviewed the participation of French scientists in important world technical developments. He also discussed the contributions of various research institutions to the advancement of science and technology, and he referred especially to services that organizations such as Battelle can render.

The newly opened laboratory building is situated on a 22-acre plot in Carouge, a suburb of Geneva. The three stories and basement have a total area of 40,000

square feet and include a pilot-plant laboratory. The main building is supplemented by a villa, which houses the administrative offices and library, and a second building which contains shops. The staff of 85 is carrying on research in the fields of physics, chemistry, and metallurgy.

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THE RADIO CORPORATION OF AMERICA has announced the development of a new, low-cost, coated paper that is so light sensitive it can make contact prints at exposures of a fraction of a second. The new paper will be used in a simplified, dry, graphic reproduction process known as "Electro-fax", which is based upon the xerography process. The Haloid Company holds the exclusive world-wide license to xerography through an agreement with The Battelle Development Corporation, a wholly-owned, nonprofit subsidiary of Battelle. Xerography, which was invented by Chester F. Carlson, was developed jointly by Battelle and Haloid. Haloid also has a license from RCA and has manufactured pilot quantities of the new light-sensitive medium.

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Dr. Harvey Goering has been appointed Chief of the physical chemistry division at Battelle. Since joining the Institute, he has carried out investigations on wood preservatives, oil additives, and, more recently, the chemistry of semiconducting materials. He received his Ph.D. in physical-organic chemistry from The Ohio State University.

The Physical Metallurgy Panel of the Ordnance Metallurgical Advisory Committee on Titanium sponsored a two-day Titanium Symposium on Heat Treating and Alloying at Battelle in December. Delegates shown here are inspecting heat-treating furnaces during a tour of the Institute. The group includes: J. Kozol and E. L. Harmon, Case Institute of Technology; G. B. Wadsworth and W. O. Harms, Oak Ridge National Laboratories; W. J. Barth and A. L. Feild, E. I. du Pont de Nemours & Company, Inc.; Marvin Parrish, Westinghouse Electric Corporation; Edwin Servis, Redstone Arsenal; J. A. Bryson, Cramet Corporation; W. L. Meinhart, Crane Company; and Edward Hodge, Battelle.

Writings by Staff Members*

Optimum Sand Concentrations in Well Treatments. Peter Dehlinger, W. H. Browne, and C. O. Bundrant. *Journal of Petroleum Technology*, vol 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, vol. 201, November, 1954, pp. 35-40.

Describes laboratory investigations to determine optimum sand concentrations in gel-sand and oil-sand well treatments where sand acts as a propping agent in formation fractures.

Effects of Certain Elements on the Graphitization of Steel. R. J. Fiorentino, A. M. Hall, and J. H. Jackson. *American Society of Mechanical Engineers, Transactions*, October, 1954, pp. 1123-1129.

Reports on the effects of various amounts of aluminum, nitrogen, and chromium and normal amounts of manganese, silicon, sulfur, and phosphorus on the graphitization of steel. High-aluminum steels with low nitrogen contents appear to be susceptible to graphitization, whereas high-nitrogen steels with low aluminum contents seem to be resistant. The effects of other elements studied are also discussed.

Graphitization in Steel. A. M. Hall. *Materials and Methods*, November, 1954, pp. 96-99.

Describes briefly the thermodynamic and kinetic nature of graphite formation in steel at elevated temperatures and how graphitization can damage steel structures. Methods that can be used for preventing deterioration caused by graphite depend on the service conditions and on the type of structure involved. One of the more common methods is reduction in temperature of the metal structure. Another is the use of a chromium steel which does not graphitize.

Molds for Titanium Castings. (Condensed from a paper by R. M. Lang, J. Gissy, G. H. Schippereit, and J. G. Kura.) *Light Metals*, November, 1954, pp. 368-370.

Studies of mold materials for titanium showed that refractory oxides embrittled the metal, but carbon caused only slight contamination with no embrittlement.

Bibliography of Butyl Rubber. E. E. McSweeney and W. J. Mueller. *Rubber Age*, November, 1954, pp. 247-252.

A comprehensive bibliography covering most of the published literature on butyl rubber.

The Chemistry of Hydrazyl Free Radicals. IV. Chromatographic Studies With α, α-Diphenyl-β-Picryl Hydrazyl and Some of Its β-Derivatives. R. H. Poirier and F. Bennington. *Journal of Organic Chemistry*, November, 1954, pp. 1847-1854.

Describes the chromatographic methods used to separate the compound α, α-diphenyl-β-picryl hydrazyl from some of its derivatives.

The Vapor Pressure of Zirconium Fluoride. Karl A. Sense, M. J. Snyder, and R. B. Filbert, Jr. *Journal of Physical Chemistry*, November, 1954, pp. 995-996.

By using the transpiration method, the vapor pressures of zirconium fluoride were measured over the temperature range of 616-881 C and the pressure range of 0.3-470 mm. The extrapolated sublimation point is 903 C.

Literature Survey on Weld-Metal Cracking. A. J. Williams, R. J. Rieppel, and C. B. Voldrich. *Report No. PB 111285*. August, 1954, Office of Technical Services, U. S. Department of Commerce, Washington, D.C.

A survey of literature on the fundamental causes of cracking in metals at both low and high temperatures, to serve as a guide for planning research on the causes of cracking in weld metals.

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**Members of the Battelle staff are authors of the recently published articles, and books listed on this page. In most cases, reprints are available from the Battelle Publications Office, 505 King Avenue, Columbus 1, Ohio.*

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BATTELLE TECHNICAL REVIEW ABSTRACTS

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***Asterisks mark items that may be used in the Battelle Library only. None of the unbound materials listed below are available for interlibrary loan.**

AERONAUTICAL ENGINEERING

1578 The Water Tunnel: Tool in Aerodynamic Research. J. M. Robertson. *Aero Digest*, v. 69, Nov. 1954, p. 34-36, 38.

Principles; apparatus; methods; cavitation testing. Photographs, diagram.

1579* A Theory of Uniform Supersonic Flow Past a Thin Oscillating Aerofoil at Appreciable Incidence to the Main Stream. Geoffrey L. Sewell. *Aeronautical Quarterly*, v. 5, Sept. 1954, p. 185-194.

Mathematical analysis. Diagrams, graph. 2 ref.

1580 A Scheme of Automatic Data Reduction for Wind Tunnels. K. V. Diprose. *AGARD Memorandum*, AG9/M5, 17 p. (TL565 Ag11)

Includes photographs, diagrams.

1581 A Note on the Use of Strain Guages in Wind Tunnel Balances. J. R. Anderson. *AGARD Memorandum*, AG10/M6, 20 p. (TL565 Ag11)

Records experience in a small wind tunnel. Diagrams, graphs, photograph.

1582 An Aspect of the Deformation of Swept Wings in Steady Supersonic Flight. B. A. Hunn and G. N. Lance. *Royal Aeronautical Society, Journal*, v. 58, Nov. 1954, p. 754-764.

Aeroelastic analysis. Diagram, graph, tables. 10 ref.

1583* The Lift and Moment Acting on a Thick Aerofoil in Unsteady Motion. L. C. Woods. *Royal Society of London, Philosophical Transactions*, v. 247, ser. A, no. 925, Nov. 4, 1954, p. 131-162.

Theory. Analysis of harmonic oscillations. Diagrams, tables, graphs. 14 ref.

1584* On the Decay of a Normally Distributed and Homogeneous Turbulent Velocity Field. I. Proudman and W. H. Reid. *Royal Society of London, Philosophical Transactions*, v. 247, ser. A, no. 926, Nov. 4, 1954, p. 163-189.

Kinematic and dynamic analysis. Graphs. 17 ref.

1585 A Method of Calibrating Airspeed Installations on Airplanes at Transonic and Supersonic Speeds by the Use of Accelerometer and Attitude-Angle Measurements. John A. Zalovcik, Lindsay J. Lina, and James P. Trant, Jr. *U. S. National Advisory Committee for Aeronautics, Report* 1145, 1953, 13 p. (TL521 Un3r)

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1586 Aerodynamic Forces and Loadings on Symmetrical Circular-Arc Airfoils With Plain Leading-Edge and Plain Trailing-Edge Flaps. Jones F. Cahill, William J. Underwood, Robert J. Nuber, and Gail A. Cheesman. *U. S. National Advisory Committee for Aeronautics, Report* 1146, 1953, 38 p. (TL521 Un3r)

Wind-tunnel studies at low Mach numbers and at several Reynolds numbers. Diagrams, tables, graphs, photographs. 12 ref.

1587 Considerations on the Effect of Wind-Tunnel Walls on Oscillating Air Forces for Two-Dimensional Subsonic Compressible Flow. Harry L. Runyan and Charles E. Watkins. *U. S. National Advisory Committee for Aeronautics, Report* 1150, 1953, 7 p. (TL521 Un3r)

Includes graphs. 6 ref.

1588 On the Application of Transonic Similarity Rules to Wings of Finite Span. John R. Spreiter. *U. S. National Advisory Committee for Aeronautics, Report* 1153, 1953, 21 p. (TL521 Un3r)

Determination of aerodynamic characteristics of wings. Graphs, diagram. 35 ref.

1589 Lift Developed on Unrestrained Rectangular Wings Entering Gusts at Subsonic and Supersonic Speeds. Harvard Lomax. *U. S. National Advisory Committee for Aeronautics, Report* 1162, 1954, 16 p. (TL521 Un3r)

Includes graphs, tables, diagrams. 20 ref.

1590 The Influence of Wheel Spin-Up on Landing-Gear Impact. W. Flügge and C. W. Coale. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3217, Oct. 1954, 107 p. (TL570 Un3t)

Differential equations for influence of wheel drag on landing-gear performance. Influence of offset wheels, inclined shock struts, and friction due to ovalization of shock-strut cylinder under bending loads. Diagrams, graphs, tables. 4 ref.

1591 Viscosity Corrections to Cone Probes in Rarefied Supersonic Flow at a Nominal Mach Number of 4. L. Talbot. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3219, Nov. 1954, 39 p. (TL570 Un3t)

Includes graphs, diagrams, photograph, tables. 24 ref.

1592 Description and Preliminary Flight Investigation of an Instrument for Detecting Subnormal Acceleration During Take-Off. Garland J. Morris and Lindsay J. Lina. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3252, Nov. 1954, 19 p. (TL570 Un3t)

Includes photographs, diagrams, graphs.

1593 Aerodynamic Forces, Moments, and Stability Derivatives for Slender Bodies of General Cross Section. Alvin H. Sacks. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3283, Nov. 1954, 74 p. (TL570 Un3t)

Includes diagrams, tables, graphs. 20 ref.

1594 Generalized Indicial Forces on Deforming Rectangular Wings in Supersonic Flight. Harvard Lomax, Franklyn B. Fuller, and Loma Sluder. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3286, Nov. 1954, 74 p. (TL570 Un3t)

Time-dependent flow over a rectangular wing moving with supersonic forward speed and undergoing small vertical distortions. Diagrams, tables, graphs. 11 ref.

1595 Comparison of Flutter Calculations Using Various Aerodynamic Coefficients With Experimental Results for Some Rectangular Cantilever Wings at Mach Number 1.3.

Aeronautical Engineering

Herbert C. Nelson and Ruby A. Rainey. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3301, Nov. 1954, 22 p. (TL570 Un3t)

A general Rayleigh analysis is used as a basis for developing four methods of flutter analysis that are applied to 12 low-aspect-ratio wings. Graphs, diagrams, tables. 5 ref.

1596 Investigation of the Aerodynamic Characteristics of a Model Wing-Propeller Combination and of the Wing and Propeller Separately at Angles of Attack up to 90°. John W. Draper and Richard E. Kuhn. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3304, Nov. 1954, 72 p. (TL570 Un3t)

Includes graphs, diagrams, photographs, tables. 8 ref.

1597 Some Measurements and Power Spectra of Runway Roughness. James H. Walls, John C. Houbolt, and Harry Press. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3305, Nov. 1954, 27 p. (TL570 Un3t)

Includes graphs, diagram, tables. 4 ref.

1598 An Investigation of a Lifting 10-Percent-Thick Symmetrical Double-Wedge Airfoil at Mach Numbers up to 1. Milton D. Humphreys. *U. S. Advisory Committee for Aeronautics, Technical Note* 3306, Nov. 1954, 35 p. (TL570 Un3t)

Wind-tunnel pressure measurements. Graphs, photographs, tables. 12 ref.

1599 An Exploratory Investigation of Some Types of Aeroelastic Instability of Open and Closed Bodies of Revolution Mounted on Slender Struts. S. A. Clevenson, E. Widmayer, Jr., and Franklin W. Diederich. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3308, Nov. 1954, 44 p. (TL570 Un3t)

Wind tunnel tests. Diagrams, graphs, photographs, tables.

1600 Initial Experiments on Flutter of Unswept Cantilever Wings at Mach Number 1.3. W. J. Tuovila, John E. Baker, and Arthur A. Regier. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3312, Nov. 1954, 19 p. (TL570 Un3t)

Wind-tunnel tests. Graphs, photographs, diagrams, tables. 6 ref.

1601 Flight Measurements of Drag and Base Pressure of a Fin-Stabilized Parabolic Body of Revolution (NACA RM-10) at Different Reynolds Numbers and at Mach Numbers From 0.9 to 3.3. H. Herbert Jackson, Charles B. Rumsey, and Leo T. Chauvin. *U. S. National Advisory Committee for Aeronautics, Techniacl Note* 3320, Nov. 1954, 20 p. (TL570 Un3t)

Includes graphs, diagrams, photographs. 3 ref.

1602 Arrangement of Fusiform Bodies to Reduce the Wave Drag at Supersonic Speeds. Morris D. Friedman and Doris Cohen. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3345, Nov. 1954, 23 p. (TL570 Un3t)

The wave drag at zero anlge of attack is studied to determine the effect of varying the relative location of the component parts. Graphs, diagrams. 10 ref.

1603* Experimental and Theoretical Investigations on Symmetrically Swept Arrow and Delta Wings. **Experimentelle und theoretische Untersuchungen an symmetrisch angeströmten Pfeil- und Deltaflügeln.** (German.) E. Truckenbrodt. *Zeitschrift für Flugwissenschaften*, v. 2, no. 8, Aug. 1954, p. 185-201.

Comparison of systematic three-component measurements with the theoretical results of swept-back and delta wings. Tables, graphs, diagrams. 11 ref.

Books and Miscellaneous Publications

1604 Wind-Tunnel Testing. Alan Pope. 2nd Ed. 511 p. 1954. John Wiley & Sons, New York. (TL567.W5 P81w2)

Description of up-to-date methods used for low- and high-speed wind tunnel testing and a discussion of modern techniques of wind tunnel design and operation.

1605 Aerodynamics. Selected Topics in the Light of Their Historical Development. Theodore von Kármán. 203 p. 1954. Cornell University Press, New York. (TL570 K14a)

Theory of lift, drag, and skin friction. Supersonic aerodynamics. Stability and aeroelasticity.

1606 Second Canadian Symposium on Aerodynamics. 290 p. 1954. Institute of Aerophysics, University of Toronto. (TL545 C16p2)

Eighteen papers covering the fields of aerodynamics, shock waves, supersonic flow, rarified gas flow, wind tunnels, projectiles, boundary layers, and wing theory.

1607 Handbook of Aeronauties, No. 2. Component Design. 4th Ed. 207 p. 1954. Sir Isaac Pitman & Sons, London. (TL672 R81c4)

Aircraft structures. Rivets and riveting techniques. Air conditioning and pressurization. Control systems. Fuel systems.

See also:
1642 (use of aircraft in pest control)
2271 (gas dynamics of thin bodies)
2381 (history of V-2 rockets)
2445 (aircraft hydraulic systems)
2517 (aircraft materials)
2675 (thermal stresses in aircraft structures)
2988 (aircraft insulation)

AGRICULTURE

1608 Commercial Use and Importance of Heavy Plant Nutrients. E. R. Purvis. *Agricultural Chemicals*, v. 9, Nov. 1954, p. 36-38, 129, 131.

Report of Cu, Fe, Mn, Mo, and Zn deficient soils throughout the U. S. and corrective measures. Maps, tables.

1609 Caution Statements for Pesticide-Fertilizer Combinations. John D. Conner. *Agricultural Chemicals*, v. 9, Nov. 1954, p. 42-44.

Legal requirements for use of warning and caution statements.

1610 Iron Chelates Control Iron Chlorosis. J. Antognini. *Agricultural Chemicals*, v. 9, Nov. 1954, p. 47-49, 131.

Use and application, technical aspects, residual effect, and absorption, of Fe EDTA. Photograph. 13 ref.

1611 Pesticide Tolerance Regulations Issued. *Agricultural Chemicals*, v. 9, Nov. 1954, p. 60-61, 135.

Tentative schedule of tolerances, released by the Food and Drug Administration, for permissible pesticide residues on fresh fruits and vegetables. Tables.

1612* Physiological Influence of Surface Feeding and Surface Fertilizing of Sugar Beets. **Fiziologicheskoe vliianie vnekornevogo pitaniia i vnekornevoi podkormki sakharnoi svekly.** (Russian.) S. S. Serbin. *Agrobiologiia*, 1954, no. 5, Sept.-Oct. p. 89-95.

Experimentally investigates the above, using sprays with KNO_3, KCl, NH_4CO_3, and K_2HPO_4 of different concentrations. Tables. 5 ref.

1613* Composition and Solubility Behavior of a Commercial Trace-Nutrient Glass. E. R. Holden and A. J. Engel. *Association of Official Agricultural Chemists, Journal*, v. 37, Nov. 1954, p. 976-984.

Solvents used show that glass must be formulated with precision to be effective as soil additives. Tables. 20 ref.

1614* Paper Chromatography of Some Organic Phosphate Insecticides. I. New Spot Test. II. Separation and Identification. III. Effects of Light on Systox and Isosystox. J. W. Cook. *Association of Official Agricultural Chemists, Journal*, v. 37, Nov. 1954, p. 984-996.

Chemistry of Systox. Tables, chromatograms, infra-red spectra. 23 ref.

1615* Separation and Identification of Chlorinated Organic Pesticides by Paper Chromatography. VI. Technical Benzene Hexachloride Lindane, Technical DDT, and Rhothane. Lloyd C. Mitchell. *Association of Official Agricultural Chemists, Journal*, v. 37, Nov. 1954, p. 996-1001.

Includes chromatograms. 5 ref.

1616* Leaf Rust Reaction in Relation to Wheat Fertilization in Indiana. K. D. Doak. *Better Crops With Plant Food*, v. 38, Nov. 1954, p. 18-22, 40-42.

Includes photographs. 8 ref.

1617* Foliar Application of Plant Nutrients to Vegetable Crops. Jackson B. Hester. *Better Crops With Plant Food*, v. 38, Nov. 1954, p. 23-24.

Greenhouse experiments with urea on tomato plants.

1618* Influence of Intensity of Light on Phosphorus Exchange in Spring Wheat in Various Periods of Its Ontogenesis. **O vliianii intensivnosti sveta na fosfornyi obmen iarovoi pshenitsy v razlichnye periody ee ontogeneza.** (Russian.) V. V. Rachinskii, B. E. Kravtsova, and E. I. Kniaziatova. *Biokhimiia*, v. 19, no. 5, Sept.-Oct. 1954, p. 513-520.

Radiometric measurement of distribution of tagged P. Tables. 14 ref.

1619 Chemicals From Castor Oil. Bradford Henderson. *Canadian Chemical Processing*, v. 39, Oct. 1954, p. 94, 96, 98.

Five treatments of castor oil.

1620 Developing a New Agricultural Chemical. J. H. Follwell. *Canadian Chemical Processing*, v. 39, Oct. 1954, p. 103-105.

A step-by-step discussion of research and testing procedures.

1621* Pathological Histology of Boron-Deficient Alfalfa Stems and Leaves as an Aid in Diagnosing Alfalfa Yellows. R. O. Lachance and G. J. Ouellette. *Canadian Journal of Agricultural Science*, v. 34, Sept.-Oct. 1954, p. 488-493 + 3 plates.

Location of the characteristic features of B-deficient alfalfa, and the significance of such findings. Table, micrographs. 15 ref.

1622* Soil and Plant Analysis as Means of Diagnosing Boron Deficiency in Alfalfa in Quebec. G. J. Ouellette and R. O. Lachance. *Canadian Journal of Agricultural Science*, v. 34, Sept.-Oct. 1954, p. 494-503 + 1 plate.

A correlation of the contents of B found in soil and plant tissue with the visual and histological symptoms of a deficiency of the element in alfalfa. Tables, graphs, photograph. 17 ref.

1623 The Production and Use of Fertilizers. Some Current Trends and Problems. E. M. Crowther. *Chemistry & Industry*, 1954, no. 46, Nov. 13, p. 1400-1415.

Types; placement; production and consumption statistics. Graphs, diagrams. 11 ref.

1624* Chromatographic Study of the Sugar Beet and Its Seed. **Khromatograficheskoe izuchenie sakharnoi svekly i ee semian. II.** Nitrogen Free Organic Acids. **Bezazotistye organicheskie kisloty. III.** Purines, Pyrimidines, Urea, Betaine, and Their Derivatives. **Puriny, pirimidiny, mochevina, betain, i ikh proizvodnye.** (Russian.) I. Vavrukh. *Collection of Czechoslovak Chemical Communications*, v. 19, no. 4, Aug. 1954, p. 817-826.

Detected 12 N-free acids and 5-pyrrolidone-2-carboxylic acid. Tables. 19 ref.

1625* Chemical Structure and Phytocidal Activity of Organic Acids or Derivatives, Containing an Electronegative Group in an Aliphatic Chain Terminating in the Acid Fuction. **Structure chimique et activité phytocide des acides organiques ou de leurs dérivés dont la molécule contient, dans une chaîne aliphatique aboutissant à la fonction acide, au moins un groupement électronégatif.** (French.) Pierre Poignant. *Comptes rendus*, v. 239, no. 14, Oct. 4, 1954, p. 822-824.

The acids and their salts possessing one halogen or one other alpha electronegative group of the carboxyl are phytocides on dicotyledons whereas the alkyl esters are inactive. On *graminaceae*, certain mono- and polyhalogens are phytocides. 2 ref.

1626* Carbon Balance During the Germination of Leguminous Seeds With the Use of Reserve Substances. **Balans ugleroda pri prorastanii semian bobovykh v sviazi s ispol'zovaniem zapasnykh veshchestv.** (Russian.) A. N. Pantaleev. *Doklady Akademii Nauk SSSR*, v. 98, no. 2, Sept. 11, 1954, p. 243-246.

Data for legume (lupine) compared with cereal (corn). Tables. 6 ref.

1627* Adaptation to Light of Citrus Plants. **O svetovoi adaptatsii tsitrusovykh rastenii.** (Russian.) T. V. Nekrasova. *Doklady Akademii Nauk SSSR*, v. 98, no. 2, Sept. 11, 1954, p. 281-284.

Relation of intensity of light and length of day to chlorophyll, starch, and ascorbic acid content. Tables. 9 ref.

1628 Toxins and Plant Diseases. E. Gäumann. *Endeavour*, v. 13, Oct. 1954, p. 198-204.

Review of plant diseases caused by microorganisms. Photographs, graphs. 15 ref.

1629* FDA Issues Pesticide Tolerances, Regulations. John Harms. *Farm Chemicals*, v. 117, Nov. 1954, p. 24 + 6 pages.

Table of residual tolerances for fruits and vegetables and an abridgement of the proposed regulations. Table.

1630* The Effect of Chronic Gamma Radiation on Endosperm Mutations in Maize. W. Ralph Singleton. *Genetics*, v. 39, Sept. 1954, p. 587-603.

Studies of radiation genetics. Tables, graphs. 11 ref.

1631* The Drying of Wheatgrain. IV. The Resistance to Airflow of Beds of Agricultural Products. Experimental Work. V. Resistance to Air Flow of Beds of Agricultural Products. A Correlation of Results. Ewen McEwen, W. H. C. Simmonds, and G. T. Ward. *Institution of Chemical Engineers, Transactions*, v. 32, no. 2, 1954, p. 115-140.

Includes graphs, diagrams, tables, photograph. 59 ref.

1632 Application of Chemicals With Air Sprayers. James P. Carr and Joseph M. Patterson. *Journal of Agricultural and Food Chemistry*, v. 2, Oct. 27, 1954, p. 1102-1104.

Technology and advantages of this recent tool that replaces hydraulic spraying. Photograph.

1633 Protein Supplementation, Influence of Processing on Supplementary Value of Vitamin B_{12} and Amino Acids to Proteins in Whole Wheat. Barnett Sure. *Journal of Agricultural and Food Chemistry*, v. 2, Oct. 27, 1954, p. 1111-1113.

Vitamin B_{12} improved protein efficiency ratio by 14% in flour alone; but by 42% with 0.4% *L*-lysine and 0.2% *DL*-threonine. Tables. 9 ref.

1634 Fertilizer Outlook. *Journal of Agricultural and Food Chemistry*, v. 2, Nov. 10, 1954, p. 1156-1168.

Market adjustments and the future of liquid fertilizers as distribution expands. Photographs.

1635 Rodent Repellents, Preparation and Properties of Thiouronium Compounds and Cyclic Imides. Ervin Bellack and James B. DeWitt. *Journal of Agricultural and Food Chemistry*, v. 2, Nov. 10, 1954, p. 1176-1179.

Most thiouronium compounds were active. Tables. 21 ref.

1636* Molybdenum as a Plant Nutrient. III. The Interrelationships of Molybdenum and Nitrate Supply in the Growth and Molybdenum Content of Cauliflower Plants Grown in Sand Culture. IV. The Interrelationships of Molybdenum and Nitrate Supply in Chlorophyll and Ascorbic Acid Fractions in Cauliflower Plants Grown in Sand Culture. S. C. Agarwala and E. J. Hewitt. *Journal of Horticultural Science*, v. 29, Oct. 1954, p. 278-300 + 2 plates.

Includes tables, graphs. 32 ref.

1637 Science and Farm Surpluses. K. Starr Chester. *Monthly Business Review*, 1954, Nov., p. 11.

Opportunities for developing new industrial crops for unused farm lands. Needs for further research work to develop additional uses for farm products.

1638* Effect of Light on the Formation of a Pigment in the Tomato Fruit Cuticle. A. A. Piringer and P. H. Heinze. *Plant Physiology*, v. 29, no. 5, Sept. 1954, p. 467-472.

Includes tables, graph. 7 ref.

Agriculture

1639* **Phosphorus Nutrition of Soybeans.** Robert W. Howell. *Plant Physiology*, v. 29, no. 5, Sept. 1954, p. 477-483.
Effects of nutrient solutions on chemical and agronomic characteristics. Tables, photograph, graphs. 18 ref.

1640* Increase of the Quality of Vegetables and Fruits. **Povyshenie kachestva oboshchei i plodov.** (Russian.) N. V. Saburov. *Priroda*, v. 43, no. 9, Sept. 1954, p. 42-46.
Influence of microelements on the growth and quality of vegetables and fruits. Tables.

1641 On the Sources of Soil Phosphorus Absorbed by Mycorrhizal Pines. E. L. Stone and Clayton McAuliffe. *Science*, v. 120, Dec. 3, 1954, p. 946-948.
Based on P^{32} migration in the plant. Graphs. 12 ref.

1642 Role of Aircraft in Forest-Pest Control. Evert W. Johnson. *Scientific Monthly*, v. 79, Dec. 1954, p. 379-391.
Includes photographs. 33 ref.

1643* **A Rapid Method for Calibrating Soil Moisture Elements of the Porous Block Type.** R. L. Closs. *Soil Science*, v. 78, Nov. 1954, p. 333-338.
Theory of method and calibration technique. Graphs. 9 ref.

1644* **New Type Electrode for Plaster of Paris Moisture Blocks.** George John Bouyoucos. *Soil Science*, v. 78, Nov. 1954, p. 339-342.
Types of electrodes; advantages; degree of uniformity; sensitivity. Tables, photographs. 7 ref.

1645* **Influence of the Polyelectrolyte CRD-186 on Aggregation and Other Physical Properties of Some California and Israeli Soils and Some Clay Minerals.** J. Hagin and G. B. Bodman. *Soil Science*, v. 78, Nov. 1954, p. 367-378.
Effects of soil conditioner on properties of disturbed soil and explanations for the mechanisms involved. Tables, graphs. 13 ref.

1646* **Adsorption of Lindane by Soils.** C. L. W. Swanson, F. C. Thorp, and R. B. Friend. *Soil Science*, v. 78, Nov. 1954, p. 379-388.
Experimental methods for determining the mechanism by which a soil insecticide reacts with the soil. Graphs, table. 18 ref.

1647* **Diffusion of Fertilizer Phosphorus in Soils.** J. M. Heslep and C. A. Black. *Soil Science*, v. 78, Nov. 1954, p. 389-401.
Measurements of the effects of various factors on diffusion in soils and on absorption of diffused P by plants. Tables, graph. 8 ref.

1648* The Problem of Soil Fatigue. **Das Problem der Bodenmüdigkeit.** (German.) P. Schachtschabel and H. Fastabend. *Umschau in Wissenschaft und Technik*, v. 54, no. 21, Nov. 1, 1954, p. 651-653.
Discussion of different theories and description of experiments, the results of which point to the formation of toxins in the soil. Photographs.

1649* **Carnauba Wax.** *World Crops*, v. 6, Nov. 1954, p. 463-464.
Harvesting, production, and uses. Photographs, table.

1650* The Magnesium of the Soil Available to Plants and Its Determination. **Das pflanzenverfügbare Magnesium des Boden und seine Bestimmung.** (German.) P. Schachtschabel. *Zeitschrift für Pflanzenernährung Düngung Bodenkunde*, v. 67, no. 1, 1954, p. 9-23.
Effects of Mg deficiency in plants. Optimum Mg fertilization for various soils. Analytical procedure. Tables, graph. 65 ref.

1651* Further Investigations on the Organic Phosphorus in the Soil. **Weitere Untersuchungen über den organischen Phosphor im Boden.** (German.) H. Bohne. *Zeitschrift für Pflanzenernährung Düngung Bodenkunde*, v. 67, no. 1, 1954, p. 57-68.
Correlation of P content with crop yields. Tables. 5 ref.

1652* Absorption and Fermentative Dissociation of Cyanamide by Higher Plants. **Über Aufnahme und fermentativen Abbau von Cyanamid durch höhere Pflanzen.** (German.) Ed. Hofmann, E. Latzko, and A. Süss. *Zeitschrift für Pflanzenernährung Düngung Bodenkunde*, v. 66, no. 3, 1954, p. 193-202.
Experiments with enzymes from different plants under a variety of conditions show that cyanamide is dissociated by fermentation. Tables. 10 ref.

1653* Effect of Potassium and Nitrogen on the Carbohydrate Economy of Pasture Plants. **Einfluss von Kalium und Stickstoff auf Ferment- und Kohlehydrathaushalt von Grünlandpflanzen.** (German.) Anton Amberger. *Zeitschrift für Pflanzenernährung Düngung Bodenkunde*, v. 66, no. 3, 1954, p. 211-222.
Effect of different amounts of K and N fertilizers on the ferment system, formation of carbohydrates, and quality of pasture plants. Tables. 15 ref.

1654* Application of Radioautography in the Study of the Adsorption and Distribution of $H_2C^{14}N_2$ by the Plant. **Anwendung der Radioautographie zum Studium der Aufnahme und der Verteilung von $H_2{}^{14}CN_2$ durch die Pflanze.** (German.) Ed. Hofmann and E. Latzko. *Zeitschrift für Pflanzenernährung Düngung Bodenkunde*, v. 66, no. 3, 1954, p. 222-226.
Tagged H_2CN_2 fertilizer to study its flow and distribution through corn and potato plants. Photographs. 5 ref.

1655* Effectiveness of Phosphorobacterine on Peat-Podzol Soils of the Kirov Region. **Effektivnost' fosforobakterina na dernovopodzolistykh pochvakh Kirovskoi oblasti.** (Russian.) L. A. Iung. *Zemledelie*, v. 2, no. 10, Oct. 1954, p. 62-70.
Extensively tested and compared. Tables.

Books and Miscellaneous Publications

1656 Chemicals Evaluated as Insecticides and Repellents at Orlando, Fla. W. V. King. Agricultural Handbook No. 69. 397 p. 1954. U. S. Department of Agriculture, Washington. (SB951 K58c)
Results of tests against mosquitoes, flies, fleas, ticks, lice, and cockroaches.

See also:
1825 (liming materials)
1857 (boron in plants)
1868 (systemic insecticide)
3174 (outline of tree nursery work)

BIOCHEMICAL AND BIOPHYSICAL RESEARCH

1657 Magnamycin B, a Second Antibiotic From *Streptomyces halstedii*. F. A. Hochstein and Kotaro Murai. *American Chemical Society, Journal*, v. 76, Oct. 20, 1954, p. 5080-5083.
Quite similar to Chas. Pfizer & Company, Inc. Magnamycin in behavior. Table, spectra. 6 ref.

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1740 (applications of glass equipment)
1767 (acid-resistant cements)
1771 (production of BeO)
2467 (grinding of glass)
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1631 (drying of agricultural products)
1982 (formation of sodium triphosphate)
1994 (commercial uses of Si compounds)
1995 (solubility of gases in petroleum products)
2316 (properties of Japanese crude oils)
2391 (continuous density measurement)
2416 (electronic controls for chemical processes)
3032 (plastics for chemical equipment)

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1 ref.

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Includes circuits, photograph, spectrogram. 1 ref.

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Use of Leitz infra-red apparatus having an average error of 1.3 to 1.7%. Graph, tables. 3 ref.

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Books and Miscellaneous Publications

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Tabulates lines from 2327.39 to 4383.55 A. and lists possible interferences from a steel containing Mn, 1.0; Si, 0.5; Ni, 1.0; Cr, 2.0; Mo, 0.8; V, 0.2; and Cu, 0.1%.

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See also:

1614 (analysis of insecticides)
1615 (analysis of pesticides)
1650 (determination of Mg)
1779 (analysis of petroleum)
1946 (analysis of vegetable fats)
1956 (analysis of petroleum)
2160 (analysis of plating solutions)
2324 (analysis of carbonate rocks)
2388 (high-frequency titration)
2390 (mass spectrometry)

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Examination of two modifications synthesized by oxidizing acetonequinic alcohol with lead tetraacetate. Tables, graph, diagram. 5 ref.

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This systemic insecticide was studied using P^{32}. Tables, graphs. 13 ref.

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Synthesis of CF_3-CH=CH-CH=CH_2, CF_3-CH=CH-C(CH_3)=CH_2, and CH_2=C(CF_3)CH=CH_2.

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2012 (conversion of hydrocarbons)
2255 (economics of methanol)
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1997 Solubilization by Potassium Laurate Solutions Containing Lauric Acid. Samuel Spring and Edgar Howard, Jr. *Journal of Colloid Science,* v. 9, Oct. 1954, p. 371-381.

Solubilization of benzene with some 1-butanol and at different ratios is studied. Tables, graphs. 9 ref.

1998 Limited Coalescence of Oil Droplets in Coarse Oil-In-Water Emulsions. R. M. Wiley. *Journal of Colloid Science,* v. 9, Oct. 1954, p. 427-437.

Phenomenon of maximum droplet size follows Gibbs-Kelvin relation. Tables. 27 ref.

1999 Free Volumes and Free Rotation in Simple Liquids and Liquid Saturated Hydrocarbons. A. Bondi. *Journal of Physical Chemistry,* v. 58, Nov. 1954, p. 929-939.

Includes graphs, tables. 29 ref.

2000 The Crystal Structure of Yttrium Trichloride and Similar Compounds. D. H. Templeton and Giles F. Carter. *Journal of Physical Chemistry,* v. 58, Nov. 1954, p. 940-944.

Determinations from single crystal X-ray diffraction data. Diagrams, tables. 17 ref.

2001 Spreading of Hydrocarbons and Related Compounds on Water. James E. Shewmaker, Carl E. Vogler, and E. Roger Washburn. *Journal of Physical Chemistry,* v. 58, Nov. 1954, p. 945-948.

Measurement of surface and interfacial tensions. Calculation of spreading coefficients. Tables.

2002 Ion-Exchange Resins. X. Magnesium-Potassium Exchange With a Polystyrenesulfonic Acid Cation-Exchange Resin. Harry P. Gregor, Oscar R. Abolafia, and Melvin H. Gottlieb. *Journal of Physical Chemistry,* v. 58, Nov. 1954, p. 984-986.

Includes graph. 14 ref.

2003 The Vapor Pressure of Zirconium Fluoride. Karl A. Sense, M. J. Snyder, and R. B. Filbert, Jr. *Journal of Physical Chemistry,* v. 58, Nov. 1954, p. 995-996.

Using the transpiration method, the vapor pressures of ZrF_4 were measured over the temperature range of 616 to 881 C and the pressure range of 0.3 to 470 mm. Table. 2 ref.

2004 Vapor Pressure Studies Involving Solutions in Light and Heavy Waters. I. The Apparatus and the Determination of Vapor Pressures at 30 C of Solutions of Sodium and Potassium Chlorides in Ordinary Water. II. The Vapor Pressure of Heavy Water and the Separation Factor of the Mixed Waters. Robert L. Combs, John M. Googin, and Hilton A. Smith. *Journal of Physical Chemistry,* v. 58, Nov. 1954, p. 997-1001.

Includes diagrams, graphs, tables. 23 ref.

2005 Infrared Emission Spectra of Cyanide and Dicarbon Radicals. W. S. Benedict and Earle K. Plyler. *Journal of Research, National Bureau of Standards,* v. 53, Sept. 1954, p. 161-164.

Region from 1 to 1.3μ studied in an oxyacetylene flame. Infrared emission spectra. 14 ref.

2006* On the Theory of the Degradation of Chain Molecules. **Zur Theorie des Abbaus von Kettenmolekülen.** (German.) Siegfried Kästner and Kurt Altenburg. *Kolloid-Zeitschrift,* v. 138, no. 3, Oct. 1954, p. 155-167.

Mathematical analysis. Diagrams, tables, graphs. 30 ref.

Chemistry—Physical

2007 Ion Exchange Resins in Medicine and Biological Research. *New York Academy of Sciences, Annals*, v. 57, Art. 3, Nov. 1953, p. 61-324. (Q11 N49a)

Twenty papers covering the synthesis, physical aspects, separation mechanisms, and pharmaceutical applications of these resins.

2008 Production and Bleaching of Color Centers in X-Rayed Alkali Halide Crystals. I. L. Mador, R. F. Wallis, M. C. Williams, and R. C. Herman. *Physical Review*, v. 96, ser. 2, Nov. 1, 1954, p. 617-628.

Includes diagrams, graphs. 21 ref.

2009* Absolute Reaction Rates of Some Heterogeneous Systems. (English.) Yoshio Kawana. *Resources Research Institute, Reports (Japan)*, 1954, no. 13, Aug., 64 p.

Results and conclusions of the absorption rates of H and heavy H by metallic Ca and the reactivity of coke. Tables, graphs, diagrams. 64 ref.

2010 Heats of Mixing. D. S. Adcock and M. L. McGlashan. *Royal Society, Proceedings*, v. 226, ser. A, Nov. 9, 1954, p. 266-282.

Apparatus and methods for measurement. Diagrams, graphs, tables. 25 ref.

2011 Heat and Free Energy Data for Titanates of Iron and the Alkaline-Earth Metals. K. K. Kelley, S. S. Todd, and E. G. King. *U. S. Bureau of Mines, Report of Investigations* 5059, Oct. 1954, 37 p. (TN21 Un3r)

Includes tables.

2012* Metals of the Eighth Group as Catalysts in the Conversions of Hydrocarbons. **Metally vos'moi gruppy kak katalizatory v prevrashcheniiakh uglevodorodov.** (Russian.) Kh. M. Minachev and N. I. Shuikin. *Uspekhi Khimii*, v. 23, no. 6, 1954, p. 737-765.

Includes tables, graph. 196 ref.

2013* Electronic Phenomena in Catalysis and Adsorption. **Elektronnye iavleniia v katalize i adsorbtsii.** (Russian.) S. Z. Roginskii. *Vestnik Akademii Nauk SSSR*, v. 24, no. 9, Sept. 1954, p. 17-23.

Review of a series of works of Soviet physicists indicating the possibility of a relation between the properties of catalysts and semiconductors. 8 ref.

2014* Contribution to the Aluminum-Selenium System. **Beitrag zum System Aluminium-Selen.** (German.) A. Schneider and G. Gattow. *Zeitschrift für anorganische und allgemeine Chemie*, v. 277, nos. 1-2, Sept. 1954, p. 49-59.

Preparation, analysis, density, X-ray structure, and heat of formation of Al_2Se_3; also new method of preparing Al_2Se by reacting Cu_2Se with Al. Tables, graph. 35 ref.

2015* On Heterotype Mixed Phases in Rare-Earth Oxides. **Über heterotype Mischphasen bei Seltenerdoxyden. II.** The Oxide Systems of Cerium and Praseodymium. **Die Oxydsysteme des Cers und des Praseodyms.** (German.) G. Brauer and H. Gradinger. *Zeitschrift für anorganische und allgemeine Chemie*, v. 277, nos. 1-2, Sept. 1954, p. 89-95.

Tables, powder diagrams, graph. 10 ref.

2016* Theory of the Liquid State. **K teorii zhidkogo sostoianiia.** (Russian.) N. M. Gerasimov. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 8, Aug. 1954, p. 1371-1381.

Application of kinetics to liquids. Formulas for internal pressure of monoatomic liquids, using X-ray data. Diagrams, tables. 13 ref.

2017* Investigation of the Porous Structure of Titanium Dioxide Films. **Issledovanie poristoi struktury plenok dvuokisi titana.** (Russian.) D. P. Dobychin and Iu. N. Andreev. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 8, Aug. 1954, p. 1465-1471.

Curves of desorption and adsorption with temperature. Graphs. 9 ref.

2018* Investigation of the Kinetics of the Crystallization of Salts From Supersaturated Solutions. **Issledovanie kinetiki kristallizatsii solei iz peresyshchennykh rastvorov. I.** Kinetics of the Growth of Single Crystals. **Kinetika rosta edinichnykh kristallov.** (Russian.) N. A. Figurovskii and T. A. Komarova. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 8, Aug. 1954, p. 1479-1488.

Crystallization of $KAl(SO_4)_2 \cdot 12H_2O$. Graphs, tables. 9 ref.

Books and Miscellaneous Publications

2019 The Strengths of Chemical Bonds. T. I. Cottrell. 310 p. 1954. Academic Press, New York. (QD501 C82s)

Discusses experimental approach, methods for determining bond dissociation energies in diatomic and polyatomic molecules, heats of formation and atomization, internuclear distances, and force constants.

2020 Superfluids. Fritz London. v. II. Macroscopic Theory of Superfluid Helium. 217 p. 1954. John Wiley & Sons, New York. (QC611 L84s)

Monograph presenting a theoretical interpretation of the more relevant properties and the role of quantum mechanics, and the relation to the future molecular theory.

2021 Properties of Surfaces. Roy Waldo Miner, editor. v. LVIII, Annals of the New York Academy of Sciences. 250 p. 1954. New York Academy of Sciences, New York. (TA407 P94)

Contains 15 papers covering adsorption, kinetics of surface reactions, monolayers, passivity, ion exchange, and oxidation of metal surfaces.

2022 Monomolecular Layers. Harry Sobotka, editor. 207 p. 1954. American Association for the Advancement of Science, Washington, D.C. (TA407 M75)

Collection of nine papers presented at a symposium in 1951 indicating the importance and significance of film technique and how its methods and concepts impinge on physical and colloid chemistry; organic and biochemistry and their contribution to analytical chemistry and chemical engineering.

See also:
1957 (thermodynamics of hydrocarbons)
1960 (hydrogen exchange of free radicals)
2333 (growth of an aerosol)
2335 (composition of aerosol)
2502 (ion exchange)
2940 (crystal growth)
3018 (Smithsonian physical tables)
3039 (flow properties of non-Newtonian materials)

COATINGS

2023 Fundamentals of Paint, Varnish and Lacquer Technology. Chap. XIII. Other Exterior Finishes. I. Elias Singer. *American Paint Journal*, v. 39, Nov. 1, 1954, p. 64 +9 pages.

Other than structural finishes. Tables. (To be continued.)

2024 Tall Oil—Its Functions in the Paint Industry. IV. Core Oils. William Brushwell. *American Paint Journal*, v. 39, Nov. 15, 1954, p. 70 + 9 pages.

Application of esters and modified esters as core oils and paint vehicles. 13 ref.

2025 Mechanisms of Paint Film Breakdown. *American Paint Journal, (Convention Daily)*, v. 39, Nov. 18, 1954, p. 20-29.

Results of 12-month Florida exposure tests on bonderized steel panels. Graphs, tables.

2026 Systematic Study of Low Odor Alkyd Paints. *American Paint Journal, (Convention Daily)*, v. 39, Nov. 20, 1954, p. 12-18, 20.

Evaluation of properties of various formulations. Tables. 5 ref.

2027 A Report on a Study of Primers for Ferrous Metals in an Atmospheric Exposure. *American Paint Journal, (Convention Daily)*, v. 39, Nov. 20, 1954, p. 20 + 6 pages.

Evaluation of properties of a number of primer systems. Tables.

2028 Corrosion. John Gehant. *American Paint Journal*, v. 39, Nov. 22, 1954, p. 71 + 7 pages.

Surveys latest findings and the part that coatings play. Table.

2029 Fundamentals of Paint, Varnish, and Lacquer Technology. Chap. XIII. Other Exterior Finishes. II. Elias Singer. *American Paint Journal*, v. 39, Nov. 29, 1954, p. 62 + 9 pages.

Formation and properties of roof, barn, drum, shingle, and marine paints. Tables.

2030* Shipbottom Paints. W. J. Francis. *American Society of Naval Engineers, Journal*, v. 66, Nov. 1954, p. 857-866.

Past, present, and future research and development in anticorrosive and antifouling shipbottom compositions. Photographs.

2031 Iriditing Replaces Anodizing at Lockheed. Gilbert C. Close. *Aviation Age*, v. 22, Nov. 1954, p. 148-153.

New treatment for applying a corrosion resistant base coating on Al alloys used in aircraft construction. Photographs, tables.

2032* Conductive Lacquers. **Geleidende lakken.** (Dutch.) H. M. Dito. *Bedrijf en Techniek*, v. 9, no. 212; *Electronica section*, v. 7, no. 159, Oct. 9, 1954, p. 161.

Some unusual applications in electrical engineering and electronics, such as in power and high-tension transformers, and in the screening of apparatus. Properties.

2033 The Story of Can Enamels. H. P. Stevens and K. W. Brighton. *Canadian Chemical Processing*, v. 39, Oct. 1954, p. 72 + 4 pages.

Describes American Can Co.'s developments. Photograph.

2034 Shop Experience in the Enameling of Aluminum. H. V. Penton. *Ceramic Age*, v. 64, sec. 1, Oct. 1954, p. 52-53.

Processing difficulties and corrective measures.

2035 How to Select, Prepare and Apply Colors in Porcelain Enameling. William G. Coulter. *Ceramic Industry*, v. 63, Nov. 1954, p. 92, 107.

Preparation of frits. Effects of temperature on fired color.

2036 Lanolin Rust Preventives. G. F. Wood and A. C. Benson. *Corrosion Technology*, v. 1, Nov. 1954, p. 328-329.

Low cost coatings can give relatively long time protection against water, acids, alkalies, and salts. Photograph.

2037 Progress in Vacuum Metallising. *Electroplating and Metal Finishing*, v. 7, Nov. 1954, p. 409-412.

Equipment and technique for applying metal films to plastics. Photographs, diagram. 2 ref.

2038 Accurate Combustion Control Improves Galvanizing Quality and Economy. *Industrial Heating*, v. 21, Oct. 1954, p. 1963-1964, 1966, 2106.

Outline of process and significance of proper application and control of gas fuel. Photographs, diagrams, graph.

2039* Phosphating. R. F. Drysdale. *Institute of Metal Finishing, Bulletin*, v. 4, Autumn 1954, p. 203-218.

Review of modern methods; factors affecting formation and crystal growth of coatings. 11 ref.

2040* Organic Protective and Decorative Coatings for Metal Containers. T. G. Green and M. Thomas. *Institute of Metal Finishing, Bulletin*, v. 4, Autumn 1954, p. 227-236; disc., p. 237-238.

Types of lacquers and application methods for use with various foods. Diagram, photograph. 8 ref.

2041* Electroless Plating Comes of Age. Abner Brenner. *Metal Finishing*, v. 52, Nov. 1954, p. 68-76; Dec. 1954, p. 61-68.

Details of process; advantages; properties of deposits of Ni and Co; equipment; pretreatment; bath characteristics; economics; need of further research. Tables, photographs, graphs. 49 ref.

2042* Surface Treatment and Finishing of Light Metals. V. Chemical Conversion Coatings. S. Wernick and R. Pinner. *Metal Finishing*, v. 52, Nov. 1954, p. 83-87.

Properties of coatings for Al. Graphs, tables. 26 ref.

2043* Zinc Coating and Painting. **Verzinkung und Anstrich.** (German.) Wilhelm Brachmann. *Metalloberfläche*, Ausgabe A, v. 8, no. 10, Oct. 1954, p. 157-160.

Protecting effect of Zn coatings on Fe; advantages of combining Zn coating with paint. Diagrams, graph, tables. (To be continued.)

2044* Defects on Zinc-Plated Sheet Metals. **Fehlererscheinungen auf verzinkten Blechen.** (German.) Hans-Joachim Wiester and Dietrich Horstmann. *Metalloberfläche*, Ausgabe B, v. 6, no. 10, Oct. 1954, p. 145-151.

Various causes of defective Zn coatings. Photographs, micrographs. 14 ref.

2045* On the Uniform Deposition of Zinc by Pot Galvanizing. **Über die gleichmässige Zinkauflage beim Feuerverzinken.** (German.) F. Sautter. *Metalloberfläche*, Ausgabe B, v. 6, no. 10, Oct. 1954, p. 156-157.

Methods of improving uniformity and reducing Zn consumption without impairing quality. 3 ref.

2046* Zinc Plating and Painting. **Verzinkung und Anstrich.** (German.) Wilhelm Brachmann. *Metalloberfläche*, Ausgabe A, v. 8, no. 11, Nov. 1954, p. 172-176.

Protection against corrosion by combining metallic with nonmetallic protective coatings; methods of securing good adhesion. Photographs. 37 ref.

2047* Further Development of the Technique of Metal Spraying. **Weiterentwicklung der Metallspritztechnik.** (German.) Hans Reininger. *Metalloberfläche*, Ausgabe B, v. 6, no. 11, Nov. 1954, p. 163-166.

Review of literature on protection against scaling; metal spraying of bearings; and repairs by metal spraying. Photographs. 34 ref.

2048* Iridite No. 14 for Protecting Aluminum Alloys. W. Castell. *Modern Metals*, v. 10, Nov. 1954, p. 42, 44-45.

Dip method of chromate conversion coatings gives low-cost corrosion resistance and paint adherence. Photographs.

2049 Steel-Contained Treatments. I. L. J. Nowacki, E. R. Mueller, and R. H. Dent. *Modern Packaging*, v. 28, Nov. 1954, p. 163-166, 246, 248.

Effects of phosphate and other pre-treatments on drum enamels. Salt spray and outdoor weathering tests. Photographs, tables. (To be continued.)

2050* Recent Developments in Iron Oxide Pigments. Irwin C. Clare. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 26, Oct. 1954, p. 902-916.

Some new pigments. Tables, graphs, micrographs.

2051* Fungus and Fungicides. Charles C. Yeager. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 26, Oct. 1954, p. 937-943.

Post war developments.

2052* Vinyltoluene Oil Copolymers and Their Use in Flat Wall Paints. A. L. Cipriano and W. A. Henson. *Official Digest. Federation of Paint and Varnish Production Clubs*, v. 26, Oct. 1954, p. 951-962.

Formulation and applications. Graphs. 1 ref.

2053 Great Lakes Testing Coatings. Paul Reed. *Oil and Gas Journal*, v. 53, Nov. 8, 1954, p. 169, 171.

Project designed to evaluate variables in composition and application to pipelines. Photographs.

2054* The Silent Enemy. E. A. Stockbower. *Ordnance*, v. 39, Nov.-Dec., p. 502-505.

Coatings for prevention of corrosion of military equipment. Table, photographs.

2055* Factors Influencing the Efficiency of Electric Infra-Red Drying and Baking. Leo Walter. *Organic Finishing*, v. 15, Nov. 1954, p. 6-9.

Processing sheet-metal articles coated with lacquers and varnishes. Heat penetration. Baking schedules. Heating elements and control equipment. Diagrams, graphs, photograph.

Coatings

2056* **The "Permanent" Organic Finish.** Francis S. Stewart. *Organic Finishing*, v. 15, Nov. 1954, p. 10-15.

Requirements, testing, and behavior of all-plastic vehicles for durable outdoor paints. Photographs.

2057* Protection Against Corrosion of Pressure Pipe Lines. **La protection contre la corrosion des conduites forcées.** (French.) Robert Bouchayer. *Ossature métallique*, v. 19, no. 10, Oct. 1954, p. 477-484.

Properties, application, and advantages of bituminous coatings. Photographs, chart.

2058* **Silicones in the Paint Industry.** L. F. Stebleton and R. C. Hedlund. *Paint Industry Magazine*, v. 69, Oct. 1954, p. 14-16.

Formulation and use of Dow-Corning resins in heat-resistant finishes. Photographs, table.

2059* **Protection of Steel. IV. Zinc Dust for Primer Coats. V. Graphite.** Martin E. Schleicher. *Paint Industry Magazine*, v. 69, Oct. 1954, p. 19, 22.

Painting of galvanized surfaces. General use of graphite discouraged.

2060 **The Specific Surface of Fine Powders. Determination by the Tinting Strength Method.** H. E. Rose. *Paint Manufacture*, v. 24, Nov. 1954, p. 377-383, 406.

Equipment and its operation. Studies to improve techniques. Diagram, graphs, tables. 3 ref.

2061 **Surface Coatings for Cans and Tubes.** W. E. Allsebrook. *Paint Manufacture*, v. 24, Nov. 1954, p. 384-386.

Requirements for lacquers used to protect tinplate. Problems of coatings for collapsible tubes. Photographs.

2062 **These Developments Have Interested Me. II. Drying Oils.** M. R. Mills. *Paint Technology*, v. 18, Nov. 1954, p. 87-91.

A review of developments for 1953 and 1954. 23 ref.

2063* **Recent Developments in Resin for Industrial Finishes.** *Paint and Varnish Production*, v. 44, Nov. 1954, p. 35 + 43 pages.

Review of 13 papers covering acrylics, alkyds, amino resins, cellulose acetate butyrate, cellulosics, chlorinated rubber, epoxy resins, polyamide-epoxy resins, hard synthetics, hydrocarbon resins, silicones, vinyls and vehicle problems by several authors. Photographs, tables. 9 ref.

2064 **A Practical Application of Electroless Nickel Plating.** John D. MacLean and Seymour M. Karten. *Plating*, v. 41, Nov. 1954, p. 1284-1287; disc., p. 1287.

Plates 0.00006 to 0.00008 in. can be deposited in 8 min. with good uniformity. Photographs, diagrams.

2065 **The Direct Application of Finish-Coat Enamels to Sheet Steel. General Considerations.** A. W. Murdoch. **Shop Practice.** B. Zick. *Sheet Metal Industries*, v. 31, no. 331, Nov. 1954, p. 939-945.

Development of enamels, metal preparation, and details of commercial processes. Table.

2066* Pointers on the Preparation of Titania Cover Coat Enamel. **Hinweise für die Herstellung von Titan-Deckemails.** (German.) Rudolf Märker. *Silikattechnik*, v. 5, no. 9, Sept. 1954, p. 385-386.

Development of enamel for kitchen utensils and household equipment which has good impact strength, acid-resistance, and resistance to temperature changes. Tables.

2067* Titania Single-Coat Enamel for Steel. **Titan-Deckemails direkt auf Stahl.** (German.) Armin Petzold and Helmut Betzer. *Silikattechnik*, v. 5, no. 9, Sept. 1954, p. 387-388.

Review of current research developments. Photograph.

2068 **Coated Containers—You Can Get More Into Them.** L. J. Nowacki. *Steel*, v. 135, Nov. 8, 1954, p. 92-93, 114.

Properties and advantages of organic coatings for lining steel drums. Photographs.

2069 **Bend Around Galvanizing Embrittlement.** R. W. Sandelin. *Steel*, v. 135, Nov. 22, 1954, p. 92-94.

Tests show that cold work is cause. Aluminum-killed steel is least susceptible. Photographs, table.

2070 **Relation Between Roughness of Interface and Adherence of Porcelain Enamel to Steel.** J. C. Richmond, D. G. Moore, H. B. Kirkpatrick, and W. N. Harrison. *U. S. National Advisory Committee for Aeronautics, Report* 1166, 1954, 9 p. (TL521 Un3r)

Studies of ground coats prepared and applied under conditions that gave various degrees of adherence. Tables, graphs, micrographs. 18 ref.

2071* Advances in the Field of Metallizing Cathode Dispersion, Anode Dispersion, High-Vacuum Vaporization, and Decomposition of Gaseous Metal Compounds. **Fortschritte auf dem Gebiet des Metallisierens. Kathodenzerstäubung, Anodenzerstäubung, Hochvakuumbedampfung und Zersetzen gasförmiger Metallverbindungen.** (German.) A. Schwarz. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 30, Oct. 21, 1954, p. 1009-1013.

Review of literature and description of principles of above methods. 17 ref.

2072* **Flow-Coat System at Douglas Gives Uniform Quality Finish on Jet Parts.** G. T. Sink and H. W. Nerpel. *Western Metals*, v. 12, Nov. 1954, p. 46-48.

Equipment and procedures in automatic paint line. Photographs, table.

Books and Miscellaneous Publications

2073 **The Technology of Solvents and Plasticizers.** Arthur K. Doolitte. 1056 p. 1954. John Wiley & Sons, New York. (TP247.5 D72t)

Hitherto scattered and unpublished data from industrial technology in a concise, comprehensive form. Both theory and practice are covered.

2074 **Metallic Coatings on Non-Metallic Materials.** Samuel Wein. 305 p. 1953. U. S. Department of Commerce, Office of Technical Services, Washington, D.C. (TS653 W43m)

Nine reports covering Ag mirrors; Cu, Ni, PbS, Au, and mechanical films; metallic paints for electronic circuits; vacuum coating methods; and applications.

See also:
1619 (castor oil in paints)
1801 (coatings)
1907 (autoxidation)
2163 (dyeing of anodic films)
2166 (hot dip tinning)
2346 (resin varnishes in lithographic inks)
2417 (viscosity of paints)

CORROSION

2075 **A Potentiostat for Corrosion Study.** M. H. Roberts. *British Journal of Applied Physics*, v. 5, Oct. 1954, p. 351-352.

Design and performance of instrument for studying the relationship between electrode potential and corrosion rate. Diagrams. 3 ref.

2076 **Corrosion Inhibitor Checklist.** Maxey Brooke. *Chemical Engineering*, v. 61, Dec. 1954, p. 230, 232, 234.

Table recommends appropriate inhibitor to be used with corrosive liquids in contact with representative metals and alloys. Table. 77 ref.

2077 **Internally-Clad Aluminum Combats Tube Bundle Corrosion.** David Stewart and Gordon Weyermuller. *Chemical Processing*, v. 17, Dec. 1954, p. 52-54.

Three refinery problems—their solution and results. Photographs.

2078 **Cathodic Protection System Eliminates Tank Bottom Failures.** Robert Spraul, W. A. Buckner, and Gordon Weyermuller. *Chemical Processing*, v. 17, Dec. 1954, p. 62-64.

Rectifier system guards against loss of product and promotes safety. Photographs.

2079 The Oxidation of Copper and Zinc. E. R. S. Winter. *Chemical Society, Journal,* 1954, Oct., p. 3342-3344.

Studies of oxidation mechanism in terms of defect structures.

2080 Galvanic Anodes Control Induced Voltages on Pipe Lines. E. H. Thalmann. *Corrosion,* v. 10, Nov. 1954, p. 367.

A problem requiring good ground-to-pipeline contact. Diagram.

2081 Corrosion of Refinery Equipment by Sulfuric Acid and Sulfuric Acid Sludges. V. J. Groth and Raymond J. Hafsten. *Corrosion,* v. 10, Nov. 1954, p. 368-389; disc., p. 389-390.

Failures, prevention, and control. Photographs, tables, graphs. 8 ref.

2082 Corrosion Resistance of Cupronickel Alloys Containing 10 to 30 Percent Nickel. Frank L. LaQue. *Corrosion,* v. 10, Nov. 1954, p. 391-399; disc., p. 399.

Application of alloys to corrosive industrial environments. Photographs, graphs, tables. 19 ref.

2083 Extrinsic Line Current Fluctuations Seriously Restrict Progress of Coating Conductance Surveys on Large Trunk Line. G. I. Russell and L. B. Nelson. *Corrosion,* v. 10, Nov. 1954, p. 400.

Anomolous currents in Trans-Mountain's 24 in. wrapped oil line are described. 3 ref.

2084 Internal Corrosion in Domestic Fuel Oil Tanks. R. Wieland and R. S. Treseder. *Corrosion,* v. 10, Nov. 1954, p. 401-406; disc., p. 406.

Residual water is chief offender; coatings failure is second. Alkaline $NaNO_2$ inhibits effectively. Photographs, tables, graphs. 2 ref.

2085 Inhibitor Evaluation by the Pearson Null Bridge. Barton L. Cross and Norman Hackerman. *Corrosion,* v. 10, Nov. 1954, p. 407-412.

Device measures change in ohmic resistance rather than potential change. Only about 70% correlation is established with other methods. Circuit diagram, graphs. 14 ref.

2086 Sulfide Corrosion Cracking of Oil Production Equipment. *Corrosion,* v. 10, Nov. 1954, p. 413-419; disc., p. 419.

A progress report by Technical Unit Committee 1-G of NACE describes latest field studies and preventive measures. Photographs, tables. 5 ref.

2087* Principles of Corrosion. I. Why Metals Corrode. W. H. J. Vernon. *Corrosion Prevention and Control,* v. 1, Nov. 1954, p. 533-538, 546.

Basic principles are explained for the non-specialist. Diagrams, table, graph.

2088 Corrosion Problems in Hospital Practice. S. J. Hopkins. *Corrosion Technology,* v. 1, Nov. 1954, p. 330-332, 343.

Types of corrosion and inhibitors for surgical equipment. Photographs. 3 ref.

2089 Detecting Corrosion in Chemical Plant. Horace Manley. *Corrosion Technology,* v. 1, Nov. 1954, p. 333-335.

Importance of early remedial action, use of ultrasonic inspection for detection of corrosion. Photographs.

2090 Corrosion in the Motor-Car. II. The Cooling System. Z. S. Michalewicz. *Corrosion Technology,* v. 1, Nov. 1954, p. 337-339.

Causes and prevention. Photographs. 7 ref.

2091 A Survey of Corrosion Inhibitors. A. Bukowiecki. *Engineers' Digest,* v. 15, Oct. 1954, p. 425-427. (From *Schweizer Archiv,* v. 20, no. 6, June 1954, p. 169-186.)

Previously abstracted from original. See item 15616, v. 3, Nov. 1954.

2092* Cathodic Protection of Pipe Lines. **Der kathodische Schutz von Rohrleitungen. I.** Principles and Process of Cathodic Protection Against Corrosion. **Grundlagen und Verfahren des kathodischen Korrosionsschutzes.** (German.) H. Steinrath. *Erdöl and Kohle,* v. 7, no. 10, Oct. 1954, p. 647-650.

Minimum and maximum protective current for a given type, size, and soil condition. Effects of stray anodic or cathodic currents. Tables, graph, diagram. 30 ref.

2093* Behavior of Different Sorts of Commercial Iron in Different Acids. **Das Verhalten technischer Eisensorten in verschiedenen Säuren.** (German.) Anton Königer. *Giesserei,* v. 41, no. 20, Sept. 30, 1954, p. 522-527.

Potentials of different cast irons and unalloyed steel in different concentrations of HNO_3 show that gray iron can be passivated by up to 19.1% acid concentrations. Diagrams, graphs. 1 ref.

2094* Contributions to the Knowledge on the Corrosion of Commercial Iron. **Beitrag zur Kenntnis der Korrosion technischen Eisens.** (German.) Anton Königer. *Giesserei,* v. 41, no. 21, Oct. 14, 1954, p. 565-569; disc., p. 569-570.

Mechanism of corrosion in the presence of H ions; H-depolarizing effect of graphite; and corrosion-inhibiting effect of ionic O. Also the effect of the cast skin, alloying components, and previous treatment on its resistance to corrosion. Diagrams, photographs, graphs. 11 ref.

2095 The Application of Cathodic Protection to Chemical Plant. F. D. Murphy. *Industrial Chemist and Chemical Manufacturer,* v. 30, Oct. 1954, p. 483-487.

Compares economics of cathodic and coatings protection. Diagrams, graphs, photograph. 4 ref.

2096 Corrosion by and Deterioration of Glycol and Glycol-Amine Solutions. W. G. Lloyd and F. C. Taylor, Jr. *Industrial and Engineering Chemistry,* v. 46, Nov. 1954, p. 2407-2416.

Clarifications of chemical factors affecting corrosion by aqueous glycol solutions and to indicate some means of controlling plant corrosion. Tables, graphs, diagrams. 30 ref.

2097 Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 46, Nov. 1954, p. 75A-76A, 78A.

Duriron shows good performance as anodes for cathodic protection with impressed currents. Photographs.

2098 The Selective Oxidation of Nickel-Chromium Alloys at High Temperatures. J. Moreau and J. Bénard. *Institute of Metals, Journal,* v. 83, Nov. 1954, p. 87-93; disc., p. 93 + 3 plates.

Tests at 800 to 1250 C in $H + H_2O$ vapors on a 4.6% Cr alloy showed the oxide structure differs markedly from the structure of the metal surface. Mechanism of oxide formation. Graph, micrographs, table, diagrams. 8 ref.

2099 Problems and Materials of Sprayer Construction. William H. Zehner. *Journal of Agricultural and Food Chemistry,* v. 2, Oct. 27, 1954, p. 1104-1106.

Chemical accumulations, corrosion, and abrasion are chief offenders. Graph, photograph.

2100* Criticism of Potentiometric Measuring as a Research Method for Corrosion. **A potenciálmérés—mint korróziós vizsgálati módszer—kritikája.** (Hungarian.) Mihály Solti. *Magyar Kémikusok Lapja,* v. 9, no. 10, Oct. 25, 1954, p. 310-314.

Evaluation of method on the basis of the literature and Hungarian investigations. Electrode potential of corroding metal; factors affecting the electrode potential. 20 ref.

2101 Corrosion Resistance of Titanium in Hydrochloric Acid and Sulfuric Acid. Warren W. Harple. *Materials & Methods,* v. 40, Nov. 1954, p. 106-108.

Curves for concentration vs. rate at various temperatures. Graphs, table.

2102* Sacrificial Anodes at Work. T. R. B. Watson. *Modern Metals,* v. 10, Nov. 1954, p. 82-84.

Savings gained by application of Mg anodes for protection of various steel installations. Diagrams.

2103 Corrosion of Nickel Cast Irons in Soils. *National Bureau of Standards, Technical News Bulletin,* v. 38, Nov. 1954, p. 160-161.

Evaluation of the effects of varying amounts of Ni in castings with respect to wt. losses and pitting, corrosion mechanics, hydraulic bursting pressure measurement, and residual strength. Table, photograph. 2 ref.

Corrosion

2104 Maybe Cathodic Protection's the Answer to Your Problem of External Well-Casing Corrosion. Yale W. Titterington. *Oil and Gas Journal*, v. 53, Nov. 8, 1954, p. 178-179.
Method of determining current requirements agrees with down-the-hole surveys. Diagram, graphs.

2105 How to Control Vapor-Zone Corrosion in Sour-Crude Tanks. A. H. Newberg and J. P. Barrett. *Oil and Gas Journal*, v. 53, Nov. 15, 1954, p. 189-190, 192.
Control by design, use of resistant materials, inhibitors, or coatings. Diagram, micrographs. 1 ref.

2106* Corrosion in the Petroleum Industry. I. F. H. Garner and A. R. Hale. *Petroleum*, v. 17, Nov. 1954, p. 407-410.
Corrosion and its mitigation in heaters, fractionators, reactors, and condensers. Photographs. (To be continued.)

2107* Field Investigation of Corrosion in Alkaline Pulping Equipment. C. B. Christiansen and J. B. Lathrop. *Pulp & Paper*, v. 55, Nov. 1954, p. 113-119.
Studies of corrosion variables and remedial measures. Diagrams, graphs. 2 ref.

2108* Corrosion Tests on Welded Austenitic Stainless Steel. **Corrosie-onderzoek van gelast austenietisch roestvrij. staal.** (Dutch.) A. Ph. Krijff and A. De Visser. *Smit Mededelingen*, v. 9, no. 3, July-Sept. 1954, p. 79-87.
Influence of plate material properties and plate thickness on test results.

2109* Oxide-Needle Meadows Grow on Metals. **Oxydnadel-Wiesen wachsen auf Metallen.** (German.) G. Pfefferkorn. *Umschau in Wissenschaft und Technik*, v. 54, no. 21, Nov. 1, 1954, p. 654-655.
Phenomenon of whisker growth, nature, and thermal conditions. Micrographs. 3 ref.

2110 Influence of Exposed Area on Stress-Corrosion Cracking of 24S Aluminum Alloy. William H. Colner and Howard T. Francis. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3292, Nov. 1954, 22 p. (TL570 Un3t)
Study of "area effect" for 24S alloy and effects of stress level, degree of sensitivity, and H_2O_2 concentration. Table, photographs, graphs, diagram, micrographs. 2 ref.

2111* Temporary Anti-Corrosion Measures. **Zeitweiliger Rostschutz.** (German.) Erich Rabald. *Werkstoffe und Korrosion*, v. 5, no. 10, Oct. 1954, p. 368-392 + 1 plate.
Survey of common practices. Special atmospheres; removable coatings; tests for coatings. Tables, graphs, photographs, diagram. 250 ref.

2112* The Corrosion of Metals and Metallic Coatings in Tropical and Subtropical Climates. **Über die Korrosion von Metallen und Metallüberzügen im tropischen und subtropischen Klima.** (German.) Willi Machu. *Werkstoffe und Korrosion*, v. 5, no. 10, Oct. 1954, p. 395-398.
Extreme temperature changes, condensation, and traces of salt are main problems. 1 ref.

2113* On the Oxidation of the Intermetallic Compound AlSb by Water. **Über die Oxydation der intermetallischen Verbindung AlSb durch Wasser.** (German.) Werner Rudorff and Ernst Justus Kohlmeyer. *Zeitschrift für Metallkunde*, v. 45, no. 10, Oct. 1954, p. 608-612.
Mechanisms of reactions; reduction of the suboxide. Graphs, tables, micrographs. 8 ref.

See also:
1766 (corrosion in steam boilers)
1791 (corrosion by sea water)
1801 (deterioration of metals)
1827 (corrosion of analytical weights)
2028 (corrosion costs)
2623 (corrosion resistance of stainless steels)

ELECTRICAL ENGINEERING

2114* The Dynamic Machine Constant of Rotating Amplifiers. (English.) J. Szablya. *Acta Technica Academiae Scientiarum Hungaricae*, v. 9, nos. 3-4, 1954, p. 365-387.
Development of means of performance evaluation. Graphs, diagrams.

2115* Developments in Insulation for Rotating Machinery. G. P. Gibson and G. L. Moses. *American Society of Naval Engineers, Journal*, v. 66, Nov. 1954, p. 917-924.
Properties and applications of new materials.

2116* The Bridged T-Network as a Measuring Bridge. **Das überbrückte T-Glied als Messbrücke.** (German.) Werner Herzog. *Archiv der elektrischen Übertragung*, v. 8, no. 10, Oct. 1954, p. 436-438.
Includes graphs, circuit diagram.

2117* The Multiple Double Shorting-Bar Measuring Method for Determining the Transforming Properties of Loss-Less $2n$ Poles Between Homogeneous Transmission Lines. **Die Mehrfach-Kurzschlussschieber-Messmethode zur Bestimmung der Transformationseigenschaften verlustloser $2n$-Pole zwischen homogenen Leitungen.** (German.) Heinz Lueg. *Archiv der elektrischen Übertragung*, v. 8, no. 10, Oct. 1954, p. 457-466.
Analysis of multi-terminal networks.

2118* Etched Circuits for Audio. Kenyon B. Howard. *Audio Engineering Society, Journal*, v. 2, July 1954, p. 171-175.
Circuit design. Production practices. Tables, photographs.

2119* The Influence of the Cathode Material on Measured Breakdown Strengths of Solid and Liquid Dielectrics. J. J. O'Dwyer. *Australian Journal of Physics*, v. 7, Sept. 1954, p. 400-409.
Effect of electronic and ionic space charge. 15 ref.

2120* Welding Wires by Condenser Discharge. **Lassen van draden met behulp van een condensatorontlading.** (Dutch.) *Bedrijf en Techniek*, v. 9, no. 212; *Electronica section*, v. 7, no. 159, Oct. 9, 1954, p. 165.
Circuit and description of method. Table.

2121 The Mechanism of Discharges in Voids of Dielectrics. J. H. Mason. *British Electrical and Applied Industries Research Association, Technical Report Reference* L/T192, 1948, 19 p. (TK1 B77t)
Investigation of the electric stress necessary to initiate discharge in small voids in polythene. Results presented for discharges between plane parallel polythene surfaces, and between polythene and a plane parallel metal electrode. Tables, diagrams, graphs. 15 ref.

2122* The Hydrogen Cooling of Turbo-Generators. E. Wiedemann. *Brown Boveri Review*, v. 41, nos. 3-4, Mar.-Apr. 1954, p. 79-93.
Generator design. Cooling equipment construction and operation. Diagrams, graphs, photographs.

2123* Influence of Fe and Cu Contents in Condenser Paper on the Quality of Condensers. **Vliianie soderzhaniia zheleza i medi v kondensatornoi bumage na kachestvo kondensatorov.** (Russian.) V. T. Renne, O. N. Kotliar, and M. A. Andreeva. *Bumazhnaia Promyshlennost'*, v. 29, no. 8, Aug. 1954, p. 18-19.
A total Fe and Cu content exceeding 0.02% causes areas of weakness in the condenser dielectric. Tables, graphs.

2124* The Quasi-Peak Voltmeter. C. W. Frick. *Communication and Electronics*, 1954, Nov., p. 417-423; disc., p. 423-425.
Construction and operation. Graphs, circuit diagrams, table. 9 ref.

2125* An Operational-Type Magnetic Amplifier for Air-Borne Servo-Control Systems. R. M. Hubbard. *Communication and Electronics*, 1954, Nov., p. 425-430; disc., p. 430.
Design, operating characteristics, and application. Circuit diagrams, graphs, table.

2126* **Stabilized Power Supplies for Instrument Applications.** W. G. Amey, F. H. Krantz, W. R. Clark, and A. J. Williams, Jr. *Communication and Electronics*, 1954, Nov., p. 484-488; disc., p. 488-489.

Examples of various methods of achieving stability. Circuits. 12 ref.

2127* Measure of an Impedance by Means of a Bi-Curve Cathodic Oscillograph: Coincidence Method. **Mesure d'une impédance au moyen d'un oscillographe cathodique bicourbe: méthode de coïncidence.** (French.) Albert Grumbach. *Comptes rendus*, v. 239, no. 15, Oct. 11, 1954, p. 869-871.

Evaluation of phase difference. The two curves are brought into coincidence by the action of a known variable.

2128* **How to Design Discontinuous Speed-Switching Circuits.** Basil T. Barber. *Control Engineering*, v. 1, Dec. 1954, p. 33-36.

A neon lamp, working as a non-linear switching element, makes the system sensitive, accurate, fast, and long lived. Graphs, circuits.

2129* **Loss of Field of Synchronous Machines.** J. E. Barkle, R. L. Tremaine, and J. L. Blackburn. *Electric Light and Power*, v. 32, Nov. 15, 1954, p. 116-120.

Study shows there is little immediate hazard to a synchronous machine itself if it momentarily loses synchronism due to loss of field. Graphs, diagram. 15 ref.

2130* Some Questions of the Theory of Reluctance Motors. **A reluktancia motor elméletének néhánykérdéséről.** (Hungarian.) K. Pál Kovács. *Elektrotechnika*, v. 47, no. 10, Oct. 1954, p. 292-307.

Steady state conditions. Torque and vector diagram while starting. Diagrams, graphs. 9 ref.

2131* Mechanical Analogue for the Demonstration of Transient Phenomena Occurring in A. C. Machines. **Mechanikai hasonlat a váltakozóáramú gépekben lezajló átmeneti folyamatok szemléltetésére.** (Hungarian.) István Rácz. *Elektrotechnika*, v. 47, no. 10, Oct. 1954, p. 307-312.

Includes diagrams. 4 ref.

2132* Telecommunication and Telemetering in Service of Electrical Power Supply. **Hírközlés és távmérés a villamosenergiaellátás szolgálatában.** (Hungarian.) Béla Luczák. *Elektrotechnika*, v. 47, no. 10, Oct. 1954, p. 313-320.

Equipment and operation. Diagrams.

2133* Electronic Switches and Selectors. **Elektronische Schalter und Wähler. Helmuth te Gude.** (German.) *Elektrotechnische Zeitschrift*, v. 75, Ausgabe A, no. 20, Oct. 1954, p. 680-686.

New tube design for a variety of relay circuits with rapid response, nonvibrating and noiseless operation, and high efficiency. Diagrams, circuits, table, graphs, photograph. 13 ref.

2134* Design of Controls and Control Panels. **Aufbau von Steuerungen und Steuerungstafeln.** (German.) Fr. Hoormann. *Elektrotechnische Zeitschrift*, v. 6, Ausgabe B, no. 10, Oct. 1954, p. 369-371.

Includes photographs, diagrams.

2135* Experimental Investigation of the Phenomenon of Subharmonic Vibrations During the Operation of a Transformer Through Series Condensers. **Eksperimental'noe issledovanie iavleniia subgarmonicheskikh kolebanii pri rabote transformatora cherez posledovatel'nye kondensatory (P.K.).** (Russian.) I. E. Ibragimov. *Energeticheskii Biulleten'*, 1954, no. 9, Sept., p. 19-25.

Includes oscillograms. 5 ref.

2136* Contributions to the Struggle Against Irreversibility. **Beiträge zum Kampf gegen die Nichtumkehrbarkeiten.** (German.) L. Heller. *Energietechnik*, v. 4, no. 9, Sept. 1954, p. 381-385.

Theoretical principles and explanations of losses in the generation, transformation, and use of energy and simple means of reducing such losses. Graphs, diagram. (To be continued.)

2137 **Contact Rectifiers for Electrolysis Installations.** G. Krahl and P. F. Stritzl. *Industrial Chemist and Chemical Manufacturer*, v. 30, Oct. 1954, p. 472-474.

Describes equipment and compares with other means of conversion. Photographs, diagrams, graph.

2138 **Determination of the D.C./A.C. Transfer Error of an Electrostatic Voltmeter.** W. E. Smith and W. K. Clothier. *Institution of Electrical Engineers, Proceedings*, v. 101, pt. 2, no. 83, Oct. 1954, p. 465-469.

Includes circuit diagrams, tables.

2139 **The Minimum-Moment-of-Error-Squared Criterion: A New Performance Criterion for Servo Mechanisms.** J. H. Westcott. *Institution of Electrical Engineers, Proceedings*, v. 101, pt. 2, no. 83, Oct. 1954, p. 471-480; disc., p. 488-492.

Method is based upon minimizing the time moment of error-squared of a system in response to a given signal. Graphs, diagrams.

2140 **Cathode-Spot Behaviour and the Thermal Control of the Emission Zone in Mercury-Arc Rectifiers.** H. von Bertele. *Institution of Electrical Engineers, Proceedings*, v. 101, pt. 2, no. 83, Oct. 1954, p. 493-506; disc., p. 506-511.

Includes diagrams, graphs, tables, photographs. 39 ref.

2141 **The Transient Behaviour of Ladder Networks of the Type Representing Transformer and Machine Windings.** T. J. Lewis. *Institution of Electrical Engineers, Proceedings*, v. 101, pt. 2, no. 83, Oct. 1954, p. 541-553.

Theory of behavior when subjected to a unit-function voltage surge. Circuit diagram, graphs. 19 ref.

2142* The Energy-Impulse Tensor of an Electromagnetic Field in a Dielectric. **Az elektromágneses tér energia-impulzus-tenzora dielektrikumokban.** (Hungarian.) Géza Györgyi. *Magyar Fizikai Folyóirat*, v. 2, no. 4, 1954, p. 255-278.

Examinations of the rotating pressure exerted by the electromagnetic field in an anisotropic medium, and the movement of the mass center. 20 ref.

2143 **N.T.C. Resistors.** *Matronics*, 1954, no. 7, Aug., p. 105-124. (TK453 M42)

Manufacture, properties, and application of negative temperature coefficient resistors. Graphs, diagrams, photographs.

2144 **Dielectric Breakdown of Thermosetting Laminates.** N. A. Skow. *Modern Plastics*, v. 32, Dec. 1954, p. 152 + 4 pages.

Includes diagrams, graphs, tables.

2145 **Importance of Duty Cycle in Selecting Polyphase Induction Motors.** J. G. Rosswog. *Product Engineering*, v. 25, Nov. 1954, p. 176-181.

Selecting the best NEMA type for machine application by evaluating starting, running, plugging, and reversing losses against heat-dissipating ability. Tables, graphs.

2146 **Measuring Load Torque in the Fractional-Horsepower Range.** John Tarbox. *Product Engineering*, v. 25, Nov. 1954, p. 184-187.

Design for a simple, inexpensive set-up to measure motor torque or machine driving loads. Survey of available commercial devices. Photographs, diagrams, graph.

2147* Electric Excitors. **Les Excitateurs Électiques.** G. de Vries. (French.) *Recherche Aéronautique*, 1954, no. 41, Sept.-Oct., p. 35-45.

Principles and operating characteristics of various types. Diagrams, graphs, table.

2148* Switch Tests for the On-Load Controls of the Voltage of Transformers. **Over de beproeving van schakelaars voor het onder belasting regelen van de spanning van transformatoren.** (Dutch.) H. B. Boerema and C. De Kuijper. *Smit Mededelingen*, v. 9, no. 3, July-Sept. 1954, p. 61-78.

Includes circuits, tables, graphs, oscillograms. 22 ref.

Electrical Engineering

2149* **Plastic Material Problems in Power Distribution.** Barney Kellam. *SPE Journal*, v. 10, Nov. 1954, p. 17-21, 45-46.

Use and testing of PVC and polyethylene insulation, tape, and pipe by a power utility company. Photographs. 2 ref.

2150* Some Anomalies in the Behavior of Metals Heated by Impulses of Current of Great Density. **Nekotorye anomalii v povedenii metallov, nagrevaemykh impul'sami toka bol'shoi plotnosti.** (Russian.) S. V. Lebedev and S. E. Khaikin. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 26, no. 5, May 1954, p. 629-639.

Investigates behavior of metal wires, especially Fe and W, during the passage of very large currents. Presentation of oscillographic data. Table, diagrams. 8 ref.

Books and Miscellaneous Publications

2151 Feedback Control Systems. Gilbert Howard Fett. Prentice-Hall Electrical Engineering Series. 361 p. 1954. Prentice-Hall, New York. (TJ213 F43f)

Stresses the interrelationship of power and electronics aspects of electrical engineering, and of mechanics and mathematics. Methods for attacking problems in this field.

2152 Alternating Current Measurements. David Owen. 3rd Ed. 120 p. 1953. John Wiley & Sons, New York. (QC535 Ow2a3)

Theory; instruments; procedures.

2153 Dielectrics and Waves. Arthur R. von Hippel. 284 p. 1954. John Wiley & Sons, New York. (QC585 V89d)

Macroscopic and molecular approach to an understanding of the polarization, magnetization, and conduction phenomena.

See also:
1689 (dielectric studies)
1703 (bibliography on titanates)
1704 (titanates as dielectrics)
1716 (SiC resistors)
1751 (magnetic amplifiers)
2032 (conductive lacquers)
2485 (discontinuous automatic control)
2486 (transient analysis of a.c. machines)
2535 (determining voltages in arc-furnaces)
3049 (electrical properties of Polythene)
3066 (epoxy resins for motor insulation)
3073 (insulating plastics)

ELECTROCHEMISTRY AND ELECTROPROCESSES

2154* Treatment of Aluminum and Its Alloys by Alternating Current in a Chromic Anhydride Bath. **Trattamento con tensione alternata dell'alluminio e delle sue leghe in bagno di anidride cromica. La formazione di "neri di alluminio".** (Italian.) L. Guerreschi. *Alluminio*, v. 23, no. 5, Oct. 1954, p. 515-532.

Conditions for anodizing plates. Tables, diagrams. 24 ref.

2155 Electroformed Gauges and Dies. *Automobile Engineer*, v. 44, Oct. 1954, p. 403-404.

Principle, application, economics, and advantages of the method for producing precision cavities in hard Ni. Photographs.

2156 Rapid Porous Chromium Plating. D. V. Pletnev and V. N. Brusentsova. *Henry Brutcher, Altadena, Calif., Translation no.* 2953, 8 p. (From *Vestnik Mashinostroeniya*, v. 32, no. 2, 1952, p. 37-40.)

Materials, equipment, and methods. Table, micrographs.

2157 Effect of Thiourea on the Electrodeposition of Copper. L. I. Antropov and S. Ya Popov. *Henry Brutcher, Altadena, Calif., Translation no.* 3377, 8 p. (Condensed from *Zhurnal Prikladnoi Khimii*, v. 27, no. 1, 1954, p. 55-63.)

Previously abstracted from original. See item 9523, v. 3, July 1954.

2158* Electrodeposition of Chromium. **Electroosazhdenie khroma.** (Russian.) A. T. Vagramian and D. N. Usachev. *Doklady Akademii Nauk SSSR*, v. 98, no. 4, Oct. 1, 1954, p. 605-607.

Polarization of cathode; current density. Reduction rate of chromic acid. Electrode potentials. Graphs. 11 ref.

2159 Anodic Behavior of Copper in HCl. Lee Stephenson and J. H. Bartlett. *Electrochemical Society, Journal*, v. 101, Nov. 1954, p. 571-581.

Electrical and optical studies of current and voltage variations and their causes. Diagram, graphs, photographs, micrographs. 18 ref.

2160 Analysis of Electroplating Solutions. II. Estimation of Boric Acid in the Presence of Nickel and Ammonium Salts. M. R. Verma and K. C. Agrawal. *Electroplating and Metal Finishing*, v. 7, Nov. 1954, p. 403-404.

Analytical techniques. 9 ref.

2161* The B.N.F. Jet-Test on Organic Bright Nickel Deposits. J. Edwards. *Institute of Metal Finishing, Bulletin*, v. 4, Spring 1954, p. 33-46.

Limitations of method. Calibration techniques. Tables, graphs.

2162* Electrodeposition and the Printing Trade. J. Riley. *Institute of Metal Finishing, Bulletin*, v. 4, Spring 1954, p. 47-62.

Processes used; special requirements. 2 ref.

2163* Practical Colour Matching on Anodic Films. A. E. Bratt. *Institute of Metal Finishing, Bulletin*, v. 4, Spring 1954, p. 63-76.

Factors influencing dye behavior; test procedures.

2164 Compact Unit Plates Heavy Ductile Coatings on Steel Wire. Herbert Kenmore. *Iron Age*, v. 174, Nov. 11, 1954, p. 117-119.

Equipment, metal savings, and applications. Photographs, graph.

2165 Modernized Facilities Plate Gravure Cylinders Better and Faster. J. H. Molitor. *Iron Age*, v. 174, Nov. 25, 1954, p. 96-97.

Copper fluoborate bath gives fine-grained, ductile deposits and cuts plating time. Photographs.

2166* Tin Plate Production at Kaiser Steel Corp. West Coast Plant. Fred A. Herr. *Metal Finishing*, v. 52, Nov. 1954, p. 77-82, 87.

Equipment for hop dip and electrolytic tinning. Photographs.

2167* Cathode Efficiency as a Control Factor. J. B. Mohler. *Metal Finishing*, v. 52, Nov. 1954, p. 91-92.

Advantages of low efficiency baths; control problems; measurements. Diagrams, graph. 2 ref.

2168* Electrolytic Zinc Coatings and Their Subsequent Treatment. **Galvanische Zinküberzüge und deren Nachbehandlung.** (German.) Heinz W. Dettner. *Metalloberfläche*, Ausgabe B, v. 6, no. 10, Oct. 1954, p. 151-155.

Review of literature on effects of bath composition, temperature, and other operating conditions on electrolytic efficiency. Graphs. 68 ref.

2169* Effect of Impurities in the Electrolyte for the Electrolysis of Alkali Chloride With Mercury Cells. **Einfluss von Verunreinigungen im Elektrolyten bei der Chlor-Alkali-Elektrolyse mit Quecksilberzellen.** (German.) Ludwig Gavanda and Oscar Hauser. *Mitteilungen des chemischen Forschungsinstitutes der Wirtschaft Österreiches*, v. 8, no. 4, Aug. 1954, p. 87-92.

Effects of Ca, Mg, Ba, Fe, V, and Mo impurities on the decomposition rate of the salt solution as a function of electrolyte concentration and time. Graphs.

2170 Disposal of Plating Wastes at a Silverware Plant. Barnett F. Dodge and Charles A. Walker. *Plating*, v. 41, Nov. 1954, p. 1288-1294; disc., p. 1294-1295.

Removal of contaminants and recovery of Ag. Tables, flowcharts.

2171 Effect of Anode Composition in Acid Copper Plating. R. P. Nevers, R. L. Hungerford, and E. W. Palmer. *Plating*, v. 41, Nov. 1954, p. 1301-1305; disc., p. 1305-1306.

Adding 0.02 to 0.03% of P to anodes eliminates sludge formation and promotes more efficient deposition. Tables, photograph, micrographs. 3 ref.

2172 Effect of Impurities and Purification of Electroplating Solutions. D. T. Ewing, J. K. Werner, C. J. Owen, W. O. Dow, and R. J. Rowe. *Plating*, v. 41, Nov. 1954, p. 1307-1311; disc., p. 1311.

Effects of Pb on Ni plate; removal of Pb from plating solutions. Tables, graphs. 7 ref.

2173* Boronizing, Siliconizing, and Boro-Siliconizing of Steels by Electrolysis. **Sur la boruration, la siliciuration et la boro-siliciuration des aciers par électrolyse.** (French.) P. Blum and J. L. Andrieux. *Revue de métallurgie*, v. 51, no. 10, Oct. 1954, p. 679-682; disc., p. 682.

Baths and techniques for various alloy steels. Mechanism of double cementation. Tables. 4 ref.

2174* Two New Results Relative to the Composition of Electropolishing Baths. **Deux nouveaux résultats relatifs à la composition des bains de polissage électrolytique.** (French.) P. Brouillet and I. Epelboin. *Revue de métallurgie*, v. 51, no. 10, Oct. 1954, p. 693-701; disc., p. 701.

Theory of electrolysis; behavior of electrode layers; and polishing of Ge and Pt. Graphs, micrographs. 7 ref.

2175* Composite Wires by Electroplating. Edward C. Slick. *Wire and Wire Products*, v. 29, Nov. 1954, p. 1324-1326, 1362-1368.

Plating procedures, corrosion resistance, strength, and ductility of Cu-plated steel wire. Photographs, graph. 8 ref.

2176* Influence of Impurties on Electrolytic Deposition of Copper From a Pyrophosphate Electrolyte. **O vliianii primesei na elektroosazhdenie medi iz pirofosfatnogo elektrolita.** (Russian.) E. A. Ukshe and A. I. Levin. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 8, Aug. 1954, p. 1434-1438.

Influence of Pb and Fe cations and halides. Tables, graphs. 8 ref.

2177* Problem of Anode Deposits Obtained During the Electrolysis of Silver Salts. **K voprosu ob anodnykh osadkakh, poluchaiushchikhsia pri elektrolize solei sereba. I.** (Russian.) M. S. Skanavi-Grigor'eva and I. L. Shimanovich. *Zhurnal Obshchei Khimii*, v. 24, no. 9, Sept. 1954, p. 1490-1495 + 1 plate.

Chemical composition and crystalline structure of deposits on Pt anode. Relation of Ag in anode to Ag deposited at cathode. Micrographs, tables. 9 ref.

See also:
2137 (rectifiers for plating installations)
2740 (costs of rolling metals)
3088 (disposal of plating wastes)

ELECTRONICS

2178 New Amplifier Has Bridge-Circuit Output. D. J. Tomcik and A. M. Wiggins. *Audio*, v. 38, Nov. 1954, p. 17-19.

New output circuit for a high quality audio amplifier. Photographs, table, circuit diagrams.

2179* The Mechanics of Good Loudspeaker Design. Abraham B. Cohen. *Audio Engineering Society, Journal*, v. 2, July 1954, p. 176-182.

Includes diagrams, photographs.

2180* Bibliography of Magnetic Recording. Alfred Jorysz. *Audio Engineering Society, Journal*, v. 2, July 1954, p. 183-199.

Covers period 1900-1954. Includes author index.

2181 A Comparator for Precise Transfer Conductance Measurements. Clarence H. Young. *Bell Laboratories Record*, v. 32, Nov. 1954, p. 427-430.

Includes photographs, circuits.

2182 Waveguide as a Communication Medium. S. E. Miller. *Bell System Technical Journal*, v. 33, Nov. 1954, p. 1209-1265.

Scale-model transmission experiments. Diagrams, graphs, photograph. 17 ref.

2183 The Wave Picture of Microwave Tubes. J. R. Pierce. *Bell System Technical Journal*, v. 33, Nov. 1954, p. 1343-1372.

Low-level operation of klystrons, resistive-wall amplifiers, easitrons, space-charge-wave amplifiers, traveling-wave tubes, and double-stream amplifiers. Diagrams, graphs. 21 ref.

2184 The Emission From Hot Cathodes in Gas Discharges. A. E. Pengelly and D. A. Wright. *British Journal of Applied Physics*, v. 5, Nov. 1954, p. 391-395.

Electron emission from different types of hot cathodes. Graphs, table. 6 ref.

2185 *H*-Plane Bifurcation of Rectangular Waveguides. R. A. Hurd and H. Gruenberg. *Canadian Journal of Physics*, v. 32, Nov. 1954, p. 694-701.

Expressions are given for the amplitudes of all the reflected and transmitted modes in the guide. Diagrams. 7 ref.

2186* Influence of the Polarization of Emitted Waves on Radar Detection. **Influence de la polarisation des ondes émises sur la détection radar.** (French.) Georges Pircher. *Comptes rendus*, v. 239, no. 13, Sept. 27, 1954, p. 756-757.

2187* Possibility of Obtaining Very Short Continuous Waves by Using a Reflex Klystron Giving an Energy on Harmonic Frequencies of a High Order of the Fundamental Oscillation. **Sur la possibilité d'obtenir des ondes entretenues très courtes en utilisant un klystron reflex donnant de l'énergie sur des fréquences harmoniques d'ordre élevé de l'oscillation fondamentale.** (French.) Jean Bernier and Henri Leboutet. *Comptes rendus*, v. 239, no. 14, Oct. 4, 1954, p. 796-798.

Includes graphs. 1 ref.

2188* Inverse Saturation Current in a Type of Rectifier With p-n Junction. **Sur le courant inverse de saturation dans un type de redresseur à jonction p-n.** (French.) Jacques Laplume. *Comptes rendus*, v. 239, no. 18, Nov. 3, 1954, p. 1126-1128.

Discusses contribution of semiconductor surface recombination to the inverse saturation current. Diagram. 2 ref.

2189* Basic Facts About Magnetic Amplifiers. Harold A. Goldsmith, Herbert Herz, and Barney J. O'Neill. *Control Engineering*, v. 1, Dec. 1954, p. 40-47.

Describes preformance of several good amplifier circuits, including two for specific servo applications. Circuits, photographs, diagrams, graphs.

2190* Thermoelectron Emission of Copper at the Melting Point. **Termoelektronnaia emissiia medi v tochke plavleniia.** (Russian.) V. G. Bol'shov and L. N. Dobretsov. *Doklady Akademii Nauk SSSR*, v. 98, no. 2, Sept. 11, 1954, p. 193-196.

Apparatus used, equations formulated, and magntiude and sign of temperature coefficient. Diagrams, graph, table. 4 ref.

2191* Problem of the Variation in the Thermal Conductivity of Semiconductors in a Magnetic Field. **K voprosu ob izmenenii teploprovodnosti poluprovodnikov v magnitnom pole.** (Russian.) Kh. I. Amirkhanov, A. Z. Daibov, and V. P. Zhuze. *Doklady Akademii Nauk SSSR*, v. 98, no. 4, Oct. 1, 1954, p. 557-560.

Magi-Righi-Leduc effect. Tolpygo's equations for calculation of thermomagnetic effect. Table, graph. 20 ref.

2192 An Alpha Plotter for Point-Contact Transistors. T. P. Sylvan. *Electrical Engineering*, v. 73, Dec. 1954, p. 1094-1098.

Test set for showing a plot of α versus emitter current on an oscilloscope. Photograph, diagrams, graphs. 4 ref.

2193 Transistor Broadcast Receivers. A. P. Stern and J. A. Raper. *Electrical Engineering*, v. 73, Dec. 1954, p. 1107-1112.

Component circuits. Performance and design. Circuit diagrams.

Electronics

2194 A Survey of Magnetic Recording. S. J. Begun. *Electrical Engineering*, v. 73, Dec. 1954, p. 1115-1118.

Development and applications. Circuit diagram, graphs. 11 ref.

2195 A Pulse-Interval Meter for Measuring Pulse Repetition Frequency. I. A. M. Andrew and T. D. M. Roberts. *Electronic Engineering*, v. 26, Nov. 1954, p. 469-474.

Principle of operation. Circuit details. Diagrams. 5 ref. (To be continued.)

2196 Differential Width Control for Television Line Scanning Circuits. K. G. Beauchamp. *Electronic Engineering*, v. 26, Nov. 1954, p. 476-481.

Includes circuit diagrams, graphs. 6 ref.

2197 Manufacturing Grown Junction Transistors. Frank H. Bower. *Electronics*, v. 27, Dec. 1954, p. 130-134.

Step by step procedure including details on growing and doping monocrystalline Ge, locating the junction and attaching the base lead. Photographs, table. 9 ref.

2198 High-Frequency Coils Use New Core Materials. Frank Rockett. *Electronics*, v. 27, Dec. 1954, p. 140-143.

Ferrite and powdered-Fe cores give new H.F. inductors and transformers the versatility and compactness of L.F. units. Toroidal construction finds greater use. Metallized glass inductors give stability and ruggedness. Photographs, graphs, diagram.

2199 Dark-Trace Display Tube Has High Writing Speed. Seymour Nozick, Norman H. Burton, and Sam Newman. *Electronics*, v. 27, Dec. 1954, p. 154-156.

Special design provides writing speed better than three times that previously available. Graphs, diagram, photograph. 5 ref.

2200 Silicon Power Rectifier Handles 1,200 Watts. E. F. Losco. *Electronics*, v. 27, Dec. 1954, p. 157-159.

Larger junction area permits radical miniaturization of high-power rectifiers because efficiency approaches 98% and remaining heat loss readily dissipated through Cu mount. Air cooling doubles power rating. Graphs, photographs, diagram, circuit.

2201 Predicted-Wave Radio Teleprinter. M. L. Doelz. *Electronics*, v. 27, Dec. 1954, p. 166-169.

New system, using diversity reception and magnetostrictive resonators for accumulating mark and space information, employs synchronizing pulse on center frequency. Photographs, graphs, circuits, diagram, oscillograms.

2202* Three-Dimensional Analogue Computer. *Engineer*, v. 198, Oct. 15, 1954, p. 532-533.

Description of a new electronic-hydraulic calculating machine for use in solving complex radar and guided missile problems. Diagram.

2203* On the Input Admittance of the Disk Triode 2C40 in the Inverted Amplifier at Maximum Frequencies. Mathematical and Experimental Results. **Über den Eingangsleitwert der Scheibentriode 2 C 40 in Gitterbasisschaltung bei Höchstfrequenzen. Rechnerische und experimentelle Ergebnisse.** (German.) C. Colani. *Frequenz*, v. 8, no. 10, Oct. 1954, p. 293-296.

Formula for computing above. Comparison with experimental results. Diagrams.

2204* Selectivity and Transit-Time Distortions in High-Frequency Amplifiers. **Selektivität und Laufzeitverzerrungen in Hochfrequenzverstärkern.** (German.) Walter Nonnenmacher. *Frenquencz*, v. 8, no. 10, Oct. 1954, p. 313-318.

Determination of limits within which a compromise can be made between selectivity, level transmission curve, and good amplification on the one hand, and constant envelope delay on the other. Graphs. 3 ref.

2205* Recent Directional Aerials in the Decimeter and Centimeter-Wave Range. **Neurere Richtantennen im Dezimeter- und Zentimeterwellenbereich.** (German.) K. O. Schmidt. *FTZ; Fernmeldetechnische Zeitschrift*, v. 7, no. 10, Oct. 1954, p. 495-497.

Mathematical analysis of operating characteristics. Diagrams. 18 ref.

2206* Wide-Band Directional Aerials for Wave-Lengths Below 20 cm. **Breitband-Richtantennen für Wellenlängen unter 20 cm.** (German.) W. Stöhr. *FTZ; Fernmeldetechnische Zeitschrift*, v. 7, no. 10, Oct. 1954, p. 510-515.

Parabolic-reflector antennas are found to be superior to lens antennas. Graphs, photographs, diagrams. 4 ref.

2207* Triodes With Very Small Electrode Spacing. **Trioden mit sehr kleinen Elektrodenabständen.** (German.) F. W. Gundlach. *FTZ; Fernmeldetechnische Zeitschrift*, v. 7, no. 10, Oct. 1954, p. 516-521.

Design considerations. Calculation of performance characteristics. Diagrams, graphs. 19 ref.

2208* The Input Conductance of Triodes. **Der Eingangsleitwert von Trioden.** (German.) W. Dahlke. *FTZ; Fernmeldetechnische Zeitschrift*, v. 7, no. 10, Oct. 1954, p. 522-528.

Mathematical analysis. Graphs, diagram, table. 6 ref.

2209* On Low-Noise Traveling-Wave Tubes. **Über rauscharme Wanderfeldröhren.** (German.) Herbert Schnitger and Dieter Weber. *FTZ; Fernmeldetechnische Zeitschrift*, v. 7, no. 10, Oct. 1954, p. 540-546.

Pre-anodes. Noise density modulation in the electron modulation in the electron beam. Graphs, diagrams. 15 ref.

2210* On the Theory of the Carcinotron. **Zur Theorie des Carcinotrons.** (German.) K. Pöschl. *FTZ; Fernmeldetechnische Zeitschrift*, v. 7, no. 10, Oct. 1954, p. 558-561.

Based on the linear theory of the traveling-wave-tube with appropriate boundary conditions the starting current of a backward-wave oscillator is calculated in its dependency on space charge. Graphs, diagrams. 7 ref.

2211 Radio Altimeter. M. Capelli. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Aeronautical and Navigational Electronics*, v. ANE-1, no. 2, June 1954, p. 3-7. (TK1 In6.6a)

Definition of principles with emphasis on such causes and effects necessary in actual development. Graphs, diagrams. 1 ref.

2212 Appraisal of Wirewound Potentiometers. J. A. Csepely. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Component Parts*, PGCP-2, Sept. 1954, p. 5-33. (TK1 In6.6cp)

Mechanical and electrical properties of rotary and rectilinear wirewound potentiometers. Drawings, circuits, photograph.

2213 Ionospheric Absorption at Vertical and Oblique Incidence. G. McK. Allcock. *Institution of Electrical Engineers, Proceedings*, v. 101, pt. 3, no. 74, Nov. 1954, p. 360-367; disc., p. 367-370.

Measurements of the ionospheric absorption of H.F. radio waves. Map, graphs, table. 24 ref.

2214 On the Optimum Illumination Taper for the Objective of a Microwave Aerial. J. W. Crompton. *Institution of Electrical Engineers, Proceedings*, v. 101, pt. 3, no. 74, Nov. 1954, p. 371-382.

Curves relating the over-all gain of an idealized aerial system with the size and illumination of aperture. Diagrams, graphs, tables.

2215 The Circuit Development of the Ampliphase Broadcasting Transmitter. T. H. Price. *Institution of Electrical Engineers, Proceedings*, v. 101, pt. 3, no. 74, Nov. 1954, p. 391-399.

Includes diagrams, graphs.

2216 Fundamentals of Analog Computers. J. A. McDonnell. *Instruments and Automation*, v. 27, Nov. 1954, p. 1797-1803.

A perturbation-equation analog solution is presented for a typical aircraft problem. Diagrams, circuits. 5 ref.

2217 Ferroelectrics and the Dielectric Amplifier. W. P. Mason and R. F. Wick. *I.R.E., Proceedings*, v. 42, Nov. 1954, p. 1606-1620.

Properties and uses of ceramics in capacitors and transducers. Drawings, graphs, oscillograms. 24 ref.

2218 Design Considerations of Junction Transistors at Higher Frequencies Based Upon an Accurate Equivalent Circuit. H. Statz, E. A. Guillemin, and R. A. Pucel. *I.R.E., Proceedings*, v. 42, Nov. 1954, p. 1620-1628.

Analysis of parameters for calculating frequency response. Tables, graphs, circuits. 5 ref.

2219 Traveling-Wave Amplifiers and Backward-Wave Oscillators. Marcel Muller. *I.R.E., Proceedings*, v. 42, Nov. 1954, p. 1651-1658.

Mathematical analysis and expressions for gain, starting current, and tuning properties. Graphs. 10 ref.

2220* Methods of Computing Transistors and Transistor Circuits With the Aid of Active Quadripoles. **Metoder för beräkning av transistorer och transistorkretsar medelst aktiva fyrpoler.** (Dutch.) Bengt Heyman. *IVA Tidskrift för Teknisk-Vetenskaplig Forskning*, v. 25, no. 6, 1954, p. 281-299.

Mathematical analysis. Diagrams. 7 ref.

2221 Effect of Velocity Distribution on Traveling-Wave Tube Grain. D. A. Watkins and N. Rynn. *Journal of Applied Physics*, v. 25, Nov. 1954, p. 1375-1379.

Includes graphs. 11 ref.

2222 Radioactive and Photoelectric *p-n* Junction Power Sources. W. G. Pfann and W. van Roosbroeck. *Journal of Applied Physics*, v. 25, Nov. 1954, p. 1422-1434.

Design of cells for producing electrical power by exposing a *p-n* junction to radioactivity or light. Diagrams, graphs. 47 ref.

2223 A Phototube Circuit With Transistors. J. P. Phillips and R. W. Keown. *Journal of Chemical Education*, v. 31, Nov. 1954, p. 605.

Includes circuit diagram. 1 ref.

2224* Electronic Equilibrium of an Illuminated Semiconductor. **Équilibre électronique d'un semi-conducteur éclairé.** (French.) G. Wlérick. *Journal de physique et le radium*, v. 15, no. 10, Oct. 1954, p. 667-676.

Progression from thermal to optical equilibrium in a semiconductor. Diagrams. 10 ref.

2225* Thermomechanics of Electric Conduction. **Sur la thermomécanique de la conduction électrique.** (French.) J. E. Verschaffelt. *Journal de physique et le radium*, v. 15, no. 11, Nov. 1954, p. 742-749.

Application of theory of transport phenomena to electric conduction by electrons and ions. 3 ref.

2226 The Physics of Cathode-Ray Storage Tubes. C. N. W. Litting. *Journal of Scientific Instruments*, v. 31, Oct. 1954, p. 351-356.

Includes graphs, diagrams, oscillograms. 9 ref.

2227 A Phonic Wheel Generator for Position Indication in Digital Computor Magnetic Drum Storage. D. R. Quested and A. D. Booth. *Journal of Scientific Instruments*, v. 31, Oct. 1954, p. 357-360.

Includes diagrams, photographs. 10 ref.

2228* The Noise Factor as a Measure of the Sensitivity of Receiver Amplifiers. **Der Rauschfaktor als Mass der Empfindlichkeit von Empfangsverstärkern.** (German.) W. Mansfeld. *Nachrichtentechnik*, v. 4, no. 9, Sept. 1954, p. 381-384.

Method of measuring noise factor. Derivation of noise equation with the aid of a simplified circuit diagram. Diagrams. 8 ref.

2229* Quartz Filters. **Quarzfilter.** (German.) L. Labutin. *Nachrichtentechnik*, v. 4, no. 9, Sept. 1954, p. 401-404.

Properties of the quartz filter and its various functions in telecommunication systems. Diagrams.

2230* Processes in Superconductors on Transition to Normal Conduction of Superconduction. **Vorgänge in Supraleitern beim Übergang Normalleitung—Supraleitung.** (German.) W. Meissner. *Naturwissenschaften*, v. 41, no. 19, Oct. 1, 1954, p. 437-440.

Review of literature and experimental determination of change in resistance and magnetic flux of an In monocrystal with rising and falling temperatures. Diagram, oscillograms. 12 ref.

2231* Strict Computation of a Typical Electrostatic Unipotential Lens. **Strenge Durchrechnung einer typischen elektrostatischen Einzellinse.** (German.) W. Glaser and P. Schiske. *Optik*, v. 11, no. 10, 1954, p. 445-467.

Includes diagrams, graphs, tables. 3 ref.

2232 Conditions for Square Hysteresis Loops in Ferrites. H. P. J. Wijn, E. W. Gorter, C. J. Esveldt, and P. Geldermans. *Philips Technical Review*, v. 16, Aug. 1954, p. 49-58.

Includes graphs, diagrams, tables, micrographs. 9 ref.

2233 Some Electrical Properties of Natural Crystals of Iron Pyrite. John C. Marinace. *Physical Review*, v. 96, ser. 2, Nov. 1, 1954, p. 593.

Measurement of resistivity and Hall effect. Graph, table.

2234 Electrical Properties and the Solid-Vapor Equilibrium of Lead Sulfide. Robert F. Brebrick and Wayne W. Scanlon. *Physical Review*, v. 96, ser. 2, Nov. 1, 1954, p. 598-602

Hall coefficient and resistivity of crystals which had been exposed to S vapor. Diagrams, graphs, table. 10 ref.

2235* Selenium Rectifiers for DC Packaged Power. Samuel Heller. *Power*, v. 98, Nov. 1954, p. 85-87.

Characteristics, advantages, and limitations of the dry-type rectifiers. Photographs, graphs.

2236* Signal Generator Using Miniature Tubes. **Signal-Generator na pal'chikovykh lampakh.** (Russian.) V. Dal'skii. *Radio*, 1954, no. 9, Sept., p. 57-60.

Proposes a new circuit for the above, covering the bands 95-300, 300-950, 950-3000, 3000-9500, and 9500-30,000 kc. using a.c. current of 110, 127 and 220v. Table, photographs, circuits.

2237* Broadband R.F. Power Meters. Irving Strauss. *Radio-Electronic Engineering*, v. 23, Dec. 1954, p. 10-11, 36.

Equipment for measuring average R.F. power from five microwatts to five watts in the 20 to 10,000 Mc. range. Photographs, diagrams.

2238 Transistor Amplifier for Meters. E. G. Louis. *Radio & Television News*, v. 52, Dec. 1954, p. 74-75, 118, 120.

Simple amplifier circuit which can be added to standard 0-1 milliamp. meters to increase sensitivity by a 10:1 ratio. Table, diagrams, photographs.

2239 Economic Aspects of Printed Foil Circuits. P. Eisler. *Research*, v. 7, Nov. 1954, p. 441-447.

Foil techniques. Applications, advantages. Photographs, graph, diagrams. 5 ref.

2240* Coaxial Trochotron for Pulse Counting. O. Sternbeck. *Science Tools*, v. 1, Sept. 1954, p. 11-13.

Operation is based on behavior of an electron beam in a magnetic field when crossed by an electric field. Device is designated as RYG 10. Photograph, diagrams, graph. 1 ref.

2241* The Evolution of Modern Television. A. G. Jensen. *Society of Motion Picture and Television Engineers, Journal*, v. 63, Nov. 1954, p. 174-188.

Describes the gradual transition from mechanical television to the present all-electronic type. Growth of network facilities. Photographs, diagrams. 40 ref.

2242* Special Battery Supplies for Transistor Applications. J. L. Dalfonso. *Transistor Research Bulletin*, v. 1, Sept. 1954, p. 3-6.

Mercury cells with characteristics compatible to transistors. Photographs, graph, drawing.

2243* Semiconductor Bibliography. *Transistor Research Bulletin*, v. 1, Sept. 1954, p. 7-10.

Electronics

2244* **L.F. Noise in Resistors Exicted by R. F. Current.** Noel B. Montagnon. *Wireless Engineer,* v. 31, Nov. 1954, p. 301-305.

Calculation and measurement of the calibrator diode load. Graphs, tables, circuit diagrams. 24 ref.

2245* Theory of Equations of Transfer in Strong Electric Fields. **K teorii uravnenii perenosa v sil'nykh elektricheskikh poliakh. I.** (Russian.) G. M. Avak'iants. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki,* v. 26, no. 5, May 1954, p. 562-575.

Investigates the transfer of heat and electricity in semiconductors. Calculation of the heating of electrons or holes in an external electric field. Thermoelectric and galvanomagnetic effects. 6 ref.

2246* Theory of Contact Phenomena [Semiconductors]. **K teorii prikontaktnykh iavlenii.** (Russian.) G. M. Avak'iants. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki,* v. 27, no. 3, Sept. 1954, p. 333-346.

How to include variation in average kinetic energy of electrons in an electrical field in calculations of contact phenomena. Table. 6 ref.

Books and Miscellaneous Publications

2247 Physics and Applications of Secondary Electron Emission. H. Bruining. 178 p. 1954. McGraw-Hill Book Co., New York. (QC721 B83p)

Methods and measurements. Theory. Applications of electron multiplication.

2248 Color TV Dictionary. J. Richard Johnson. 70 p. 1954. John F. Rider Publisher, New York. (TK6670 J63c)

Definitions are based on NTSC standards.

2249 Fundamentals of Transistors. Leonard M. Krugman. 140 p. 1954. John F. Rider Publisher, New York. (QC544.T3 K93f)

Semiconductor physics. Operation and applications of transistors in amplifiers, oscillators, and other equipment.

2250 Dielectric Materials and Applications. Arthur R. von Hippel, editor. 438 p. 1954. John Wiley & Sons, New York. (TK3401 V89d)

Applied theory, characteristics, measuring techniques, calculations, and devices made from non-metals; military requirements and tabulated dielectric data of 600 materials.

2251 Textbook of Servomechanisms. John C. West. 238 p. 1953. English Universities Press, London. (TJ213 W52t)

Basic principles.

2252 Proceedings 1954 Electronic Components Symposium. 224 p. 1954. Office of the Assistant Secretary of Defense, Washington, D.C. (TK7870 Sy94p)

Forty-one papers on new component developemnts, materials, solid state devices, applications and automatic production of electronic equipment.

See also:
1717 (electrostrictive relay)
1801 (electronic equipment)
2133 (electronic switches)
2354 (observation of electrical transients)
2487 (automatic production of electronic equipment)
2679 (point-contact Si transistors)
2700 (acceptor centers in Ge)
2735 (servo positioning)
2775 (metal whiskers)
2870 (bibliography on ultrasonic delay lines)
2893 (electronic equipment)
2970 (effects of atmospherics on amplifiers)
3000 (surface properties of Ge)
3001 (effects of lattice defects in Ge and Si)
3017 (semicondutcor physics)
3113 (applications of semiconductors)

ENGINEERING ECONOMICS

2253 Control of Costs in Production. David E. Pierce and Winfield I. McNeill. *Chemical Engineering Progress,* v. 50, Nov. 1954, p. 552-555.

Includes graphs.

2254 Market Research as a Tool of Management. R. E. Chaddock. *Chemical Engineering Progress,* v. 50, Nov. 1954, p. 575-577.

Includes graph.

2255 What's in Store for Methanol. Frank E. Dolian and Walter C. Gwinner. *Chemical Week,* v. 75, Nov. 27, 1954, p. 43 + 5 pages.

Review of production capacity and uses. Forecast of future consumption prospects. Graphs, tables.

2256 Progress in the Indian Chemical Industry. *Industrial Chemist and Chemical Manufacturer,* v. 30, Oct. 1954, p. 501-503.

A review of 1953. 35 ref.

2257* Statistical Quality Control. III. The Concept of Control Charts. Delmer C. Dague and John D. Hinchen. *SPE Journal,* v. 10, Nov. 1954, p. 22-27, 30.

Explains design of charts; examples of deviation. Tables, graphs. 4 ref.

2258* Position of the West German Iron and Steel Industry in the Free Market. **Die westdeutsche Stahlindustrie im freien Markt.** (German.) Gerhard Schroeder. *Stahl und Eisen,* v. 74, no. 23, Nov. 4, 1954, p. 1453-1455.

Market development, scrap, wages, price policy, investments, and prospects. Tables.

Books and Miscellaneous Publications

2259 Case Studies in Commercial Chemical Development. John E. Ullman. 134 p. 1953. Chemonomics, New York. (TP155 UL4c)

Describes market research reports on 37 products, both trade sales and industrial.

2260 Introduction to Engineering Economy. Baldwin M. Woods and E. Paul DeGarmo. 2nd Ed. 519 p. 1953. The Macmillan Co., New York. (TA153 W86i2)

Financial aspects of engineering. Investments; accounting procedures; depreciation; cost analysis.

See also:
1634 (markets for fertilizers)
1694 (markets for refractories)
1773 (cost control)
1782 (costs of butadiene production)
2102 (savings by using cathodic protection)
2545 (economics of salvaging Zn from draws)
2598 (diecasting costs)
2850 (drilling costs)
2951 (coal washing costs)
2953 (costs of coal washing)
3107 (economics of synthetic and natural rubbers)
3129 (welding costs)

FLUID MECHANICS

2261* Compressible Flow of a Semi-Perfect Gas. D. B. Spalding. *American Society of Naval Engineers, Journal,* v. 66, Nov. 1954, p. 992-1004.

Velocity-temperature relationships. Effects of nozzles, shock waves, and chemical reactions. Diagrams, graphs.

2262 A Portable Electric Velometer for Low Velocity Liquids. A. D. Misener. *Canadian Journal of Technology,* v. 32, Nov. 1954, p. 242-249.

Use of thermistor as detector unit for velocities up to 4 m.p.h. with accuracy of 0.1 m.p.h. Diagrams, photographs, circuit-diagram, graphs.

2263* Resistance to Flow in Smooth Pipes Found Directly. Ralph W. Powell. *Civil Engineering*, v. 24, Nov. 1954, p. 62-63.

Includes nomograms.

2264 The Laminar Boundary Layer With Variable Fluid Properties. E. R. Van Driest. *Heat Transfer and Fluid Mechanics Institute, Preprint*, 1954, p. 127-141. (QC320 H35p)

Presents an extension of the Crocco analysis for zero pressure gradient extended to include variable Prandtl number. Graphs. 7 ref.

2265* Harmonic Wave Solutions of the Non-Linear Vorticity Equation for a Rotating Viscous Fluid. Shih-Kung Kao. *Journal of Meteorology*, v. 11, Oct. 1954, p. 373-379.

Study of fluid motion including the effects of viscosity and the height dependency of velocity components. Diagram. 11 ref.

2266* Exact Viscosimetry and Model Theory for Rheology. **Exakte Viskosimetrie und Modelltheorie für die Rheologie.** (German.) F. Schultz-Grunow. *Kolloid-Zeitschrift*, v. 138, no. 3, Oct. 1954, p. 167-178.

Determination of flow constants. General law of friction for flow processes. Experimental determination and theoretical evaluation of the velocity field in capillaries. Graphs, photographs, diagrams. 5 ref.

2267 An Experimental Investigation of the Interaction Between Shock Waves and Boundary Layers. G. E. Gadd, D. W. Holder, and J. D. Regan. *Royal Society, Proceedings*, v. 226, ser. A, Nov. 9, 1954, p. 227-253 + 2 plates.

Includes diagrams, photographs, graphs. 33 ref.

2268 Diffusion of Heat From a Line Source of Isotropic Turbulence. Mahinder S. Uberoi and Stanley Corrsin. *U. S. National Advisory Committee for Aeronautics, Report* 1142, 1953, 29 p. (TL521 Un3r)

Mathematical and experimental determination of temperature distributions in turbulent flow. Graphs, photographs, diagram, tables. 31 ref.

2269 A Visualization Study of Secondary Flows in Cascades. Howard Z. Herzig, Arthur G. Hansen, and George R. Costello. *U. S. National Advisory Committee for Aeronautics, Report* 1163, 1954, 51 p. (TL521 Un3r)

Flow-visualization techniques are employed to ascertain the streamline patterns of the non-potential secondary flows in the boundary layers. Photographs, diagrams, graphs. 5 ref.

Books and Miscellaneous Publications

2270 Transactions of the Symposium on Fluid Mechanics and Computing. Garrett Birkhoff, K. O. Friedrichs, and T. E. Sterne, editors. 243 p. 1954. Interscience Publishers, New York. (QC151 Sy68t)

Fourteen papers on compressible and turbulent flow, problems solvable on computing machines, and deformation of thin shells by shock waves.

2271 Gas Dynamics of Thin Bodies. F. I. Frankl and E. A. Karpovich. 175 p. 1953. Interscience Publishers, New York. (QC161 F85gtr) (Translated from the Russian by M. D. Friedman).

A monograph of compressible flow around bodies of revolution, wings of infinite span in steady motion, linearized theory of bodies and wings, unsteady flows and problems of supersonic propellers, and conical flow fields.

2272 Fluid Dynamics of Jets. Shih-I Pai. 227 p. 1954. D. Van Nostrand Co., New York. (QC145 P15f)

Characteristics of subsonic and supersonic laminar and turbulent flow.

See also:
2340 (disturbances in a thin layer of fluid)
2370 (mechanics of film cooling)
2393 (ultrasonic flowmeter)
2848 (flow resistance in pipes and casings)

FOOD TECHNOLOGY

2273 Chemical Engineering Methods in the Food Industry. E. Capstick. *Chemistry & Industry*, 1954, no. 41, Oct. 9, p. 1242-1248.

History of whole and condensed milk treatment. Table, graphs. 20 ref.

2274* Unsolved Problems in the Production of Food: Chocolate. **Ungelöste Probleme bei der Herstellung von Nahrungsmitteln: Schokolade.** (German.) A. G. Lipscomb. *Fette, Seifen, Anstrichmittel*, v. 56, no. 10, Oct. 1954, p. 803-809.

Growing, fermentation, drying, roasting, and conching of chocolate and cocoa butter. Photograph, diagrams, tables. 12 ref.

2275* Practical Value of Ultrasonics for the Chocolate Industry. **Vom praktischen Wert des Ultraschalls für die Schokoladen-Industrie.** (German.) G. Mosimann. *Fette, Seifen, Anstrichmittel*, v. 56, no. 10, Oct. 1954, p. 818-820.

Application in conching. Influence on quality. Graphs.

2276 Flavor Origin. Flavor and Odor Components in the Tomato. Mary S. Spencer and William L. Stanley. *Journal of Agricultural and Food Chemistry*, v. 2, Oct. 27, 1954, p. 1113-1118.

Materials obtained by vacuum distillation (at 20 mm), solvent extraction, and molecular distillation were isolated by chromatography. Ultra-violet spectrograms, tables. 7 ref.

2277 Cereals in Nutrition. Nutritive Value of Rice Germ. Marinus C. Kik. *Journal of Agricultural and Food Chemistry*, v. 2, Nov. 10, 1954, p. 1179-1181.

Physiology of the rice kernel. Tables. 15 ref.

2278 Cereal Storage Effects. Deteriorative Changes in the Oil Fraction of Stored Parboiled Rice. David F. Houston, Irving R. Hunter, Elizabeth A. McComb, and Ernest B. Kester. *Journal of Agricultural and Food Chemistry*, v. 2, Nov. 10, 1954, p. 1185-1190.

Method may apply to other complex deterioration processes. Tables, graphs. 21 ref.

2279* The Significance of Protective Foods and the Tasks of Preventive Diets. **A védőétel es védőélelmezés jelentősége ès feladatai.** (Hungarian.) Róbert Tarján and György Lamm. *Magyar Kémikusok Lapja*, v. 9, no. 10, Oct. 25, 1954, p. 299-301.

Enlarges the concept of protective foods into including foods giving protection aganist toxic effects of work or other environment. The mechanism of their effect and economic problems are outlined.

2280* Use of Antibiotics in the Food Industry. **Ob ispol'zovanii antibiotikov v pishchevoi promyshlennosti.** (Russian.) Ia. I. Rautenshtein. *Vestnik Akademii Nauk SSSR*, v. 24, no. 5, May 1954, p. 44-48.

Survey of trends and future needs.

Books and Miscellaneous Publications

2281 The World's Food. M. K. Bennett. 282 p. 1954. Harper & Brothers, New York. (HD9000 B43w)

Economic analysis of relation of food to population growth and war, based on world's population changes, national diets under varying conditions, and on the international impact of hunger in relation to income and eating habits.

2282 Advances in Food Research. E. M. Mrak and G. F. Stewart, editors. v. V. 538 p. 1954. Academic Press, New York. (TP370 Ad95)

A collection of seven reviews on current food problems by 11 recognized authors.

See also:
1633 (additives for wheat flour)
1672 (nutritive values of wheat and rye)
2033 (enamels for food containers)
2040 (containers for foods)

FUELS AND COMBUSTION

2283 Some Aspects of Combustion of Liquid Fuel. Charles C. Graves and Melvin Gerstein. *AGARD Memorandum*, no. AG16/M10, 26 p. (TL565 Ag11)

Burning of fuel sprays in air streams and turbojet combustors. Graphs, micrographs, diagrams. 25 ref.

2284 Experimental Investigation of Internal Structure of Flames. J. W. Linnett. *AGARD Technical Presentations Before the AGARD Combustion Panel*, no. AG5/P2, p. 9-15. (TL565 Ag11p)

Studies of burning velocity and temperature distribution. 26 ref.

2285 Ignition Delay Measurements on Gas Turbine Fuels by the N.G.T.E. Method. B. P. Mullins. *AGARD Technical Presentations Before the AGARD Combustion Panel*, no. AG5/P2, p. 16-31. (TL565 Ag11p)

Description of method. Results of tests on various fuels. Graphs, diagrams. 21 ref.

2286* Relation Between Net Heat of Combustion and Aniline-Gravity Product of Aircraft Fuels. Ralph S. Jessup and Joseph A. Cogliano. *ASTM Bulletin*, 1954, no. 201, Oct., p. 55-61.

Includes tables, graphs. 18 ref.

2287* Electrophoresis of Some Neutral Polysaccharides. D. H. Northcote. *Biochemical Journal*, v. 58, Nov. 1954, p. 353-358.

Includes diagram, photographs. 17 ref.

2288* Our Present Physical and Chemical Picture of Coal. **Unser derzeitiges physikalisches und chemisches Bild der Kohle.** (German.) D. W. van Krevelen. *Brennstoff-Chemie*, v. 35, nos. 19-20, Oct. 20, 1954, p. 289-298.

Chemical structure and changes in chemical structure with progressing carbonization. Graphs, tables. 27 ref.

2289* Plastic Behavior of Coal. **Über das plastische Verhalten von Steinkohlen.** (German.) H. Hoffmann and K. Hoehne. *Brennstoff-Chemie*, v. 35, nos. 19-20, Oct. 20, 1954, p. 298-304.

Plastic properties of different coals. Factors which determine the coking quality of coals. Graphs, tables.

2290* Generation of City Gas From Water Gas, Natural Gas, and Liquid Gases, and Observation of the Changes in the C-H-O Triangle. **Stadtgaserzeugung aus Wassergas, Erdgas und Flüssiggasen und Beobachtung der Veränderungen im C-H-O-Dreieck.** (German.) Fritz Schuster. *Brennstoff-Chemie*, v. 35, nos. 19-20, Oct. 20, 1954, p. 304-307.

The C-H-O diagram as a means of establishing the proper composition and observing chemical changes during generation. Graphs, tables.

2291* Oxidation, Atmospheric Degradation, and Spontaneous Ignition of Coal. **Oxydation, Verwitterung und Selbstentzündung von Steinkohlen.** (German.) W. Lange and W. Winzen. *Brennstoff-Wärme-Kraft*, v. 6, no. 10, Oct. 1954, p. 382-385.

Slow atmospheric oxidation, conditions of spontaneous combustion, and measures of reducing loss of fuel value from spontaneous oxidation. Tables, graphs, photograph. 14 ref.

2292* The Cyclone Furnace. G. C. H. Sharpe. *British Coal Utilisation Research Association, Monthly Bulletin*, v. 18, Aug. 1954, p. 349-372.

Equipment and operation. Diagrams, tables. 69 ref.

2293* Contribution to the Study of Sampling, Reduction, and Analysis of Solid Mineral Fuels. **Contribution è l'étude sur l'échantillonnage, la réduction et l'analyse des combustibles minéraux solides.** (French.) E. Rieffel and J. Danquigny. *Chaleur & Industrie*, v. 35, no. 351, Oct. 1954, p. 277-302.

Ash content determination. Reduction methods. Tables, diagrams, graphs.

2294 Continuous Coking Process Promises Low Cost Production. Kurt Baum. *Combustion*, v. 26, Nov. 1954, p. 61-65.

Reaction theory, applications, and calculations to establish the basic laws behind "autogenetic coking". Graphs, diagrams, table.

2295* Oilheating Maturity. J. E. Dyer. *Fueloil & Oil Heat*, v. 13, Nov. 1954, p. 71-74.

Data show importance of the underrated distillate fuels in the petroleum industry. Tables.

2296* Sulphur Removal From Fuel Gases by Dry Methods. R. H. Griffith. *Gas Journal*, v. 280, Oct. 27, 1954, p. 254-257.

Purification by Fe_2O_3. Equipment, materials, and methods. Graphs, table. 17 ref. (To be continued.)

2297* Breeze Burning for Steam Raising. C. H. G. Hayward. *Gas Times*, v. 81, Oct. 29, 1954, p. 173-174, 176-177.

Methods of burning coke breeze. Tables.

2298 Current Status of Problems of Combustion. Marjorie W. Evans. *Heat Transfer and Fluid Mechanics Institute, Preprint*, 1954, p. 39-50. (QC320 H35p)

Discusses the physics and chemistry of gaseous deflagrative processes and current experimental and theoretical work in one-dimensional steady-state, incipient, nonisotropic, turbulent, and pulsating flames. 34 ref.

2299 On the Burning of Single Drops of Fuel in an Oxidizing Atmosphere. M. Goldsmith and S. S. Penner. *Heat Transfer and Fluid Mechanics Institute, Preprint*, 1954, p. 51-70. (QC320 H35p)

Expressions obtained for the burning rate, temperature at flame front, and radius of combustion surface. Graphs, tables, diagrams. 10 ref.

2300 Structure and Propagation of Combustion Waves. N. Thomas. *Heat Transfer and Fluid Mechanics Institute, Preprint*, 1954, p. 71-88. (QC320 H35p)

Includes graphs, diagrams. 18 ref.

2301 On the Stability of a Heterogeneous System. C. C. Miesse. *Heat Transfer and Fluid Mechanics Institute, Preprint*, 1954, p. 243-262. (QC320 H35p)

Investigates the possible inherent instability of the system, and the effects of various conditions. Graphs, photographs. 7 ref.

2302 Temperature Dependence of Stability Limits of Burner Flames. Joseph Grumer and Margaret E. Harris. *Industrial and Engineering Chemistry*, v. 46, Nov. 1954, p. 2424-2430.

Fundamental concepts of burner performance which consider the entrainment of air by a gas jet and the exchangeability of fuels in a community. Graphs, tables, diagram. 12 ref.

2303 Burners for Gas and Oil. Charles E. Eeles. *Industrial Heating*, v. 21, Oct. 1954, p. 1990, 1992, 2152, 2160.

Design, operation and proper application of three types of burners.

2304* The Spontaneous Heating of Coal. G. A. W. van Doornum. *Institute of Fuel, Journal*, v. 27, Oct. 1954, p. 482-495.

Calculation of the temperature-rise in a reacting coal pile. Graphs, tables, diagrams. 11 ref.

2305* The Effect of Auxiliary Fuel Firing on the SO_3 Content of Flue Gases From a Coal-Fired Boiler. K. Barker and P. F. Corbett. *Institute of Fuel, Journal*, v. 27, Oct. 1954, p. 495-502.

Experimental techniques and test results in the use of auxiliary fuels as a means of forming C smokes in plant flue gases. Graphs, tables, diagram. 12 ref.

2306* An Air-Blast Atomizer for Use With Viscous Fuels. H. Clare and A. Radcliffe. *Institute of Fuel, Journal*, v. 27, Oct. 1954, p. 510-515.

Description and performance of atomizer; fuel and air flow; particle size. Diagrams, graphs.

2307 Application of Infra-Red Spectrometry to the Analysis of Combustion Products Containing Carbon Dioxide, Carbon Monoxide and Small Proportions of Propane. A. P. C. Cumming. *Journal of Applied Chemistry*, v. 4, Oct. 1954, p. 561-568.

Correction curves for deviations from Beer's law. Calibration curves, diagram, tables. 8 ref.

2308 Flame Quenching by a Variable-Width Rectangular-Channel Burner as a Function of Pressure for Various Propane-Oxygen-Nitrogen Mixtures. A. L. Berlad. *Journal of Physical Chemistry*, v. 58, Nov. 1954, p. 1023-1026.

Includes graphs, tables. 8 ref.

2309 Calorimetric Properties of Normal Heptane From 0° to 520°K. Thomas B. Douglas, George T. Furukawa, Robert E. McCoskey, and Anne F. Ball. *Journal of Research, National Bureau of Standards*, v. 53, Sept. 1954, p. 139-153.

Heat capacity, enthalpy, entropy, and Gibbs free energy presented. Compared with other studies. Tables, graphs. 26 ref.

2310* Low-Temperature Carbonization of Indian Coals Under Fluidized Conditions. K. Y. Shrikhande, A. K. Das Gupta, and A. Lahiri. *Journal of Scientific & Industrial Research*, v. 13, sec. B, Sept. 1954, p. 634-641.

Presents yield and quality of products obtained. Tables, micrographs, graphs, diagram. 12 ref.

2311* Wood Tar as an Antioxidation Addition to Hydrocarbon Fuels. **Drevesnaia smola kak antiokislitel'naia dobavka k uglevodorodnym toplivam.** (Russian.) Ia. B. Chertkov and V. N. Zrelov. *Neftianoe Khoziaistvo*, v. 32, no. 9, Sept. 1954, p. 70-74.

Includes graphs, table. 9 ref.

2312* Fuel Research—1953. *Petroleum*, v. 17, Nov. 1954, p. 401-406.

Review of progress in British work on synthesis of oils, chemistry of catalysts, and structure of fuel oils. Photograph, tables, graphs. 4 ref.

2313 Examine Fuel Oils With Microscope. A. O. Walker and J. P. Stanton. *Petroleum Refiner*, v. 33, Nov. 1954, p. 187-191.

Misroscopy is superior to "accelerated" tests in evaluating storage behavior of fuel oil and diesel fuel. Micrographs, table. (To be continued.)

2314* Pulsating Combustion: Can We Use Cyclone Furnace, Air-Turbine Cycle? F. H. Reynst. *Power*, v. 98, Nov. 1954, p. 88-92.

Consideration of the factors to improve steam-power performance. Diagrams.

2315* Stabilization of Flames by Obstacles. **Stabilisation des flammes par des obstacles.** (French.) André Mestre. *Recherche Aéronautique*, 1954, no. 41, Sept.-Oct., p. 23-26.

Includes graphs, diagrams. 3 ref.

2316* Properties of Japanese Crude Oils. (Japanese.) Akio Jotani, Tomoichi Horio, Takahisa Iwasaki, and Kiichi Inoue. *Resources Research Institute, Reports (Japan)*, no. 11, Aug. 1954, 163 p.

Analytical data on 127 crude oils classified by oil field and by oil layer. Tables, maps.

2317* The International Study Committee on the Radiation of Flames; Its Organization and Activities. **Le comité international d'études sur le rayonnement des flammes: son organisation et son activité.** (French.) M. Michaud and G. Monnot. *Revue de l'institut français du pétrole et Annales des combustibles liquides*, v. 9, no. 9, Sept. 1954, p. 509-527.

Reports on experimental furnaces at Ijmuiden and Stockholm. Photographs, diagrams, table, graphs.

2318* Use of the Tube Method for Measuring Combustion Rates. **L'utilisation de la méthode du tube pour la mesure des vitesses de déflagration.** (French.) H. Guénoche and M. Jouy. *Revue de l'institut français du petrole et Annales des combustibles liquides*, v. 9, no. 10, Oct. 1954, p. 562-572.

Includes photographs, diagrams. 16 ref.

2319* Studies on the Extraction of Bituminous Coals With Solvents. **Studi sull'estrazione con solventi di carboni bituminosi. I.** Sulcis Coal: Extraction With Various Types of Solvents and Quality of the Extracts. **Carbone del Sulcis: estrazione con vari tipi di solventi e qualità degli estratti.** (Italian.) V. Berti, C. Siniramed, and C. Manci. *Rivista dei Combustibili*, v. 8, no. 9, Sept. 1954, p. 639-667.

Soxhlet extraction of Sulcis, Sardinia, bituminous coal with ethylene diamine and monoethanol amine and component analysis. Tables, graphs. 19 ref.

2320 X-Ray Scattering From Coals. P. B. Hirsch. *Royal Society, Proceedings*, v. 226, ser. A, Nov. 9, 1954, p. 143-169 + 2 plates.

Describes the results of X-ray scattering experiments on a series of vitrain-coals of varying rank. Tables, graphs, diagrams. 32 ref.

2321 National Annual Diesel-Fuel Survey, 1954. O. C. Blade. *U. S. Bureau of Mines, Report of Investigations* 5084, Oct. 1954, 24 p. + 4 plates. (TN21 Un3r)

Properties of four grades of fuel with respect to the geographical location of refineries. Tables, graphs, map. 8 ref.

Books and Miscellaneous Publications

2322 Microscopic Studies of Uraniferous Coal Deposits. James M. Schopf and Ralph J. Gray. U. S. Dept. of Interior, Geological Survey Circular 343, 1954, 10 p. (QE75 Un3c)

Quantitative coal petrologic studies on beds of U-bearing lignite and analyses of the deposits as possible sources of U. Tables, graphs. 10 ref.

See also:
1731 (shale coke)
1775 (gaseous fuels from petroleum residues)
1840 (sampling of coal)
2038 (combustion control)
2356 (flame stabilization)
2548 (fuel technology)
2593 (combustion cupola furnace)
2594 (metallurgical coke)
2965 (quality of coke)

GEOLOGY AND MINERALOGY

2323* The Problem of the Two Types of Diamond. G. B. B. M. Sutherland, D. E. Blackwell, and W. G. Simeral. *Nature*, v. 174, Nov. 13, 1954, p. 901-904.

Characteristics of two types having differences in infra-red and ultra-violet absorption, photoconductivity, and birefringence. Tables. 15 ref.

2324 Simplified Techniques of Determining Calcium and Magnesium Content of Carbonate Rocks. George V. Chilingar and Richard D. Terry. *Petroleum Engineer (Management Edition)*, v. 26, Nov. 1954, p. B110-B112.

As a possibly valuable geologic tool, quick determination methods are reviewed which are based on the ratio of Ca to Mg in limestones. Tables, diagram. 4 ref.

Books and Miscellaneous Publications

2325 Occurrence of Uranium in Carbon County, Pennsylvania. Harry Klemic and R. C. Baker. U. S. Dept. of Interior, Geological Survey Circular 350, 1954, 8 p. (QE75 Un3c)

Includes map, tables, diagram. 8 ref.

2326 Occurrences of Radioactive Minerals in the Bald Mountain Gold-Mining Area, Northern Black Hills, South Dakota. R. C. Vickers. U. S. Dept. of Interior, Geological Survey Circular 351, 1954, 8 p. (QE75 Un3C)

Survey of six radioactive occurrences in Lawrence County. Maps, tables. 12 ref.

See also:
1977 (crystallography)
2917 (geochemistry of isotopes)

GEOPHYSICS

2327* Foraminifera and Deep-Sea Research. Fred B. Phleger. *Deep-Sea Research*, v. 2, Oct. 1954, p. 1-23.

Distributions of various planktons in the Atlantic and the Gulf of Mexico. Maps, photographs, table. 39 ref.

2328* The Direct Measurement of Subsurface Currents in the Oceans. K. F. Bowden. *Deep-Sea Research*, v. 2, Oct. 1954, p. 33-47.

Apparatus and techniques employed in making observations and methods of analyzing data. Tables, map. 31 ref.

2329 Fog Modification By Cold-Water Seeding. Vernon G. Plank. *Geophysics Research Directorate Geophysical Research Papers no* 31, *Air Force Cambridge Research Center Technical Report* 54-201, Aug. 1954, 21 p. (QC806 Un3.2g)

Review of the physical pictures of the water mass transfer and heat transfer processes; evaluation of the proposal of fog dispersal. Diagrams, graphs, tables. 9 ref.

2330 The Physics of the Ionosphere. J. A. Ratcliffe. *Institution of Electrical Engineers, Proceedings*, v. 101, pt. 1, no. 132, Nov. 1954, p. 339-346.

Electron distribution in the F-layer. Irregularities and movements. Graphs.

2331 Correlation Between Optical and Dynamic Methods of Measuring Size of Water Drops in a Cloud. Y. G. Naik. *Journal of Colloid Science*, v. 9, Oct. 1954, p. 393-399.

Mie theory and Cunningham equation agree for drops of 1 to 5 μ radii. Tables, graph. 23 ref.

2332* On Gravity Waves in the Atmosphere. Earl Gossard and Walter Munk. *Journal of Meteorology*, v. 11, Aug. 1954, p. 259-269.

Observations. Comparison with theory. Tables, graphs, diagrams. 8 ref.

2333* The Diffusion-Controlled Growth of an Aerosol in a Turbulent Medium. H. L. Frisch. *Journal of Meteorology*, v. 11, Aug. 1954, p. 270-275.

Mathematical analysis. Graph. 9 ref.

2334* The Meridional Growth of Squall Lines. Abdul J. Abdullah. *Journal of Meteorology*, v. 11, Aug. 1954, p. 301-308.

Includes diagrams. 7 ref.

2335* The Chemical Composition of Atmospheric Aerosols. 1. Measurements at Round Hill Field Station, June-July 1953. Christian E. Junge. *Journal of Meteorology*, v. 11, Aug. 1954, p. 323-333.

Data obtained on Atlantic coast. Graphs, tables, diagrams. 8 ref.

2336* The Composition of Hygroscopic Particles in the Atmosphere. S. Twomey. *Journal of Meteorology*, v. 11, Aug. 1954, p. 334-338.

Studies of particles $> 10^{-12}$ g. by use of a phase-transition method. Tables, micrographs, graph, tables. 4 ref.

2337* Diffusion Charging of Atmospheric Droplets by Ions, and the Resulting Combination Coefficients. Ross Gunn. *Journal of Meteorology*, v. 11, Oct. 1954, p. 339-347.

Theoretical and experimental investigations of electrical charging of spheres at rest and in motion with respect to ionized air and the significance of diffusion processes. Graphs. 12 ref.

2338* Measurements of the Electrification of Spheres by Moving Ionized Air. B. B. Phillips and Ross Gunn. *Journal of Meteorology*, v. 11, Oct. 1954, p. 348-351.

Experimental measurements permits determination of the functional dependence of the charge magnitude and rate of accumulation upon the ventilation velocity. Graphs, diagram. 4 ref.

2339* The Applicability of Continuous-Fluid Theory in the Higher Atmosphere. Donald G. Yerg. *Journal of Meteorology*, v. 11, Oct. 1954, p. 387-391.

Criteria for selection of mass element; modifications of the equations of motion. Tables. 7 ref.

2340* Symmetrical Disturbances in a Thin Layer of Fluid Subject to a Horizontal Temperature Gradient and Rotation. H.-L. Kuo. *Journal of Meteorology*, v. 11, Oct. 1954, p. 399-411.

Includes graphs, table. 11 ref.

2341* Wind Effect on Shallow Bodies of Water With Special Reference to Lake Okeechobee. (English.) Hans R. Kivisild. *Kungl. Tekniska Högskolans Handlingar (Transactions of the Royal Institute of Technology, Stockholm, Sweden)*, 1954, no. 83, 146 p. (T4 K96t)

Includes diagrams, map, graphs, tables. 126 ref.

2342* Observation of the Total Eclipse of the Sun on June 30, 1954. **Az 1954 június 30-i teljes napfogyatkozás megfigyelése.** (Hungarian.) Imra Csada, Loránt Dezső, and Tibor Herczeg. *Magyar Fizikai Folyóirat*, v. 2, no. 4, 1954, p. 251-253.

Report on the Hungarian expedition to Pulkovo observatory in the northern Caucasus. Cloud formations hampered the observation. Photographic work is discussed. Photograph.

2343* Polarization Patterns in Submarine Illumination. Talbot H. Waterman. *Science*, v. 120, Dec. 3, 1954, p. 927-932.

Related to natural behavior of sea life. Graph. 26 ref.

Books and Miscellaneous Publications

2344 Design of the Universe. The Heavens and the Earth. Fritz Kahn. 373 p. 1954. Crown Publishers, New York. (Q159 K12d)

Modern concepts of physics are applied to origin and characteristics of stars and planets.

2345 The Sun. Gerard P. Kuiper, editor. 745 p. 1953. University of Chicago Press, Chicago. (QB521 K95s)

Structure; radiation; activity. Observation methods. Effects on earth.

See also:
2213 (ionospheric absorption of H.F. waves)
2915 (radiocarbon dating)
3017 (geophysics)

GRAPHIC ARTS

2346* The Impact of Synthetic Resin Varnishes on Lithographic Inks. Charles R. Conquergood. *Canadian Printer and Publisher*, v. 63, Nov. 1954, p. 41, 92.

Provides the lithographer with new tools to speed production, raise quality, and increase versatility.

2347* Investigation of Absorption Spectrum of Primary Centers in the Grains of a Photographic Emulsion. **Issledovanie spektra pogloshcheniia pervichnykh tsentrov v zernakh fotograficheskoi emulsii.** (Russian.) E. A. Kirillov and E. A. Nesterovskaia. *Doklady Akademii Nauk SSSR*, v. 98, no. 4, Oct. 1, 1954, p. 609-610.

Includes graph, table. 3 ref.

2348* The Coated Papers in Letterpress Printing. **Die gestrichenen Papiere im Flachdruck.** (German.) Ernst Speth. *Fachhefte für die Chemigraphie, Lithographie und den Tiefdruck*, 1954, no. 4, p. 143-149.

Methods of coating; composition of coating materials; and problems of printing coated paper. Table.

2349* Optical Sensitization of Photographic Films. **Die optische Sensibilisierung photographischer Schichten.** (German.) H. Zwicky. *Fachhefte für die Chemigraphie, Lithographie und den Tiefdruck*, 1954, no. 4, p. 160-165.

Pigments to render AgBr sensitive to visible and infra-red light rays; factors to be considered in sensitizing films without impairing quality. Graphs.

2350* Photography in Oil Research. II. A. J. Insall and J. W. Drinkwater. *Petroleum*, v. 17, Nov. 1954, p. 391-394.

Applications in studies of engine deposits, lubrication of wire-drawing dies, and structure of greases. Diffraction patterns, photographs, diagrams, micrograph.

2351* The Formation of the Photographic Latent Image in the Silver Halides. G. W. Luckey. *Photographic Science and Technique*, v. 1, Nov. 1954, p. 115-120.

Recent work on Ag halide emulsions and fused crystals; nature of the latent image; efficiency of image formation; data on electron and positive-hole formation, motion, and trapping. Micrographs, diagram. 104 ref.

2352* Properties of Developing Agents. VI. Acceleration of Weak Agents by Combination With Phenylpyrazolidone. R. W. Henn and J. R. King. *Photographic Science and Technique*, v. 1, Nov. 1954, p. 126-130.

Includes graphs, tables. 8 ref.

2353 Underwater High-Speed Photography. Marshall Cooksey. *Research Engineer (Georgia Institute of Technology)*, v. 9, Oct. 1954, p. 11-17.

Cameras. Lighting and protecting equipment. Photographs, graph. 3 ref.

2354* High-Speed Observation. The Study of Optical and Electrical Transients. W. Nethercot. *Times Science Review*, 1954, Winter, p. 17-18.

Use of high speed cameras and oscillographs. Photographs.

See also:
1801 (optical equipment)
2162 (electrodeposition in the printing industry)
2165 (plating of gravure cylinders)
2845 (camera for use in tubes or welds)
2996 (rotating prism camera)
3110 (carbon blacks)

HEAT POWER

2355 Two Spool Aircraft Engines. John Mitchell Stephenson. *Aero Digest*, v. 69, Nov. 1954, p. 58-60, 62-63.

Comparison of single and double-coaxial shaft jet engines. Graphs, diagrams, photograph.

2356* Flame Stabilisastion in High Velocity Gas Streams and the Effect of Heat Losses at Low Pressures. D. B. Spalding, and B. S. Tall. *Aeronautical Quarterly*, v. 5, Sept. 1954, p. 195-217.

Jet-engine flame stabilization. Analysis of flame reactions. Graphs, diagrams. 26 ref.

2357* Thermodynamic Aspects of Propellants for Rockets. **Aspetti termodinamici e propulsivi dell'endoreattore.** (Italian.) Ernesto Macioce. *Aerotecnica*, v. 34, no. 4, Aug. 1954, p. 196-203.

Includes graphs. 13 ref.

2358 Combustion Instability in Rocket Motors. Luigi Crocco. *AGARD Technical Presentations Before the AGARD Combustion Panel*, no. AG5/P2, p. 32-53. (TL565 Ag11p)

Review of ideas and theoretical results. Graphs, diagrams. 11 ref.

2359 Combustion Problems in Turbojets. Jean Surugue. *AGARD Technical Presentations Before the AGARD Combustion Panel*, no. AG5/P2, p. 54-67. (TL565 Ag11p)

Effect of fuel properties and performance characteristics of combustion equipment. Photographs, diagrams, graphs.

2360 Combustion Problems in Ramjets. Raymond Siestrunck. *AGARD Technical Presentations Before the AGARD Combustion Panel*, no. AG5/P2, p. 79-90. (TL565 Ag11p)

Effects of mechanical and combustion instabilities. Use of flame holders. Photographs, diagram, graph.

2361* The Free-Piston Gas-Generator Turbine as a Power Plant for Ship Propulsion. F. A. I. Muntz and H. Huber. *American Society of Naval Engineers, Journal*, v. 66, Nov. 1954, p. 946-952.

Equipment and operating characteristics. Diagrams, graphs.

2362 The Oxidation, Decomposition, Ignition, and Detonation of Fuel Vapors and Gases. XXIV. The Adverse Effect on Thermal Efficiency of the Endothermic Cracking Reaction Required for the Compression Ignition of Paraffin Hydrocarbons. R. O. King and A. B. Allan. *Canadian Journal of Technology*, v. 32, Nov. 1954, p. 220-241.

Includes oscillograms, graphs. 13 ref.

2363 Practical Finned Tube Design. E. J. Skiba. *Chemical Engineering*, v. 61, Dec. 1954, p. 182-186.

Method of determining heat transfer coefficients of the many shapes and sizes of heat exchangers. Diagrams, graph, tables.

2364* Thermodynamics Favors Supercritical Steam Pressures. Jerome Bartels. *Electric Light and Power*, v. 32, Nov. 15, 1954, p. 102-108.

Theoretical analysis reveals thermal gains of as much as 12% with supercritical over present-day subcritical pressures. Graphs, table, diagram.

2365* Plant Experiences With Radiation Superheaters. **Betriebserfahrungen mit Strahlungsüberhitzern.** (German.) H. Taubert. *Energietechnik*, v. 4, no. 9, Sept. 1954, p. 401-404.

Data on new superheater and plant experiments to determine causes of damages and optimum operating conditions. Diagrams, graphs.

2366* Development of the Steam Turbine. F. Dollin. *Engineer*, v. 198, Nov. 5, 1954, p. 623-628.

Blade and nozzle research equipment and results; effects of standardization of steam conditions, turbine ratings, and materials of construction. Graphs, tables, diagram. 5 ref.

2367 Wave Action in Diffusers for Pipe System: Scavenging Two-Stroke Engines. F. J. Wallace. *Engineering*, v. 178, Oct. 22, 1954, p. 524-528.

Quantitative estimation of processes occurring within the diffuser and a solution to their problems. Tables, charts, diagram, graph. 1 ref.

2368 Boiler House Instrumentation and Boiler Efficiency. Almont H. Koepf. *Heating and Ventilating*, v. 51, Dec. 1954, p. 72-74.

Use of instruments to determine combustion efficiency. Flow diagram, photograph, table.

2369 Three Dimensional Flow in a Cascade. Nguyen Van Le. *Heat Transfer and Fluid Mechanics Institute, Preprint*, 1954, p. 159-170. (QC320 H35p)

Presents a theory leading to the prediction of the overturning and underturning due to the secondary flow in a cascade of turbomachine blading. Diagrams, graphs. 6 ref.

2370 The Mechanics of Film Cooling. I. Eldon L. Knuth. *Jet Propulsion*, v. 24, Nov.-Dec. 1954, p. 359-365.

Properties of thin liquid wall films flowing under the influence of high-velocity turbulent gas streams. Diagrams, photographs, graphs. 30 ref. (To be continued.)

2371 Transpiration Cooling in Porous Metal Walls. E. Mayer and J. G. Bartas. *Jet Propulsion*, v. 24, Nov.-Dec. 1954, p. 366-368, 378.

Determination of temperature distributions. Graph.

2372* Gasoline Injection. **A benzin befecskendezése.** (Hungarian.) Antal Csajághy. *Közlekedéstudományi*, v. 4, no. 6, June 1954, p. 218-227.

Theory and applications in engines of high compression ratio, particularly two-stroke motors. Diagrams, graph. 4 ref.

2373* The Automotive Gas Turbine: Some Considerations of Heat Exchanger Design. II. E. P. Hawthorne. *Oil Engine and Gas Turbine*, v. 22, Oct. 1954, p. 244-246.

Discusses various types of recuperators and regenerators and design factors for automotive-type heat exchanger. Diagrams.

2374 Using More Natural Gasoline in Motor Fuels. III. T. W. Legatski and H. J. Elder. *Oil and Gas Journal*, v. 53, Nov. 8, 1954, p. 185.

Four to 6% butane could be tolerated in present fuels. Tables.

Heat Power

2375* Vapor Phase Engine Cooling. Lloyd C. Harbert. *Pipe Line Industry*, v. 1, Aug. 1954, p. 44-48.

Eliminates circulating water pumps and variations in engine jacket temperatures, reduces engine wear, and provides an inexpensive source of steam. Graphs, tables, diagrams,, photographs. 2 ref.

2376* How Ash of Residual Fuel Oil Affects High-Temperature Boiler Operation. J. O. Collins and W. A. Herbst. *Power*, v. 98, Nov. 1954, p. 100-101, 218, 220.

Effects of trace elements on boiler refractories, increased boiler deposits, and high-temperature corrosion. Remedies. Photographs.

2377 The Development of the Spill Flow Burner and Its Control System for Gas Turbine Engines. F. H. Carey. *Royal Aeronautical Society, Journal*, v. 58, Nov. 1954, p. 737-753.

Includes photographs, diagrams, graphs, tables.

2378* Gasoline Additives. New Ways of Increasing Engine Efficiency. **Benzin-Additive. Neue Wege zur Steigerung der Motorleistung.** (German.) Friedrich Kneule. *Umschau in Wissenschaft und Technik*, v. 54, no. 21, Nov. 1, 1954, p. 641-644.

General report on laboratory and field experiments with different types of additives designed to increase the antiknock propetries of gasoline and reduce engine deposits; effect of engine design on deposit formation. Diagrams, photographs. 1 ref.

2379 Photographic Investigation of Combustion in a Two-Dimensional Transparent Rocket Engine. Donald R. Bellman, Jack C. Humphrey, and Theodore Male. *U. S. National Advisory Committee for Aeronautics, Report* 1134, 1953, 12 p. (TL521 Un3r)

Description of the photographic technique; evaluation of combustion photographs resulting from use of three types of injector configuration; and an analysis of combustion irregularities. Diagrams, photographs, tables. 4 ref.

2380 Smoke Study of Nozzle Secondary Flows in a Low-Speed Turbine. Milton G. Kofskey and Hubert W. Allen. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3260, Nov. 1954, 24 p. (TL570 Un3t)

Studies of boundary-layer and wake secondary-flow phenomena. Photographs, diagrams, graphs, tables. 4 ref.

Books and Miscellaneous Publications

2381 V-2. Walter Dornberger. 281 p. 1954. The Viking Press, New York. (UF767 D73v) (Translated from the German by James Cleugh and Geoffrey Holliday.)

History of development of the "V-2" rocket at Peenemünde in World War II.

2382 High Speed Aerodynamics and Jet Propulsion. v. IX. Physical Measurements in Gas Dynamics and Combustion. R. W. Ladenburg, B. Lewis, R. N. Pease, and H. S. Taylor, editors. 578 p. 1954. Princeton University Press, Princeton. (TL709 H53)

Measurements of density, pressure, velocity, temperature, shock fronts, and turbulence of burning gas flows.

See also:
2350 (engine deposits)

INFORMATION—PREPARATION AND DISSEMINATION

2383 The Third Dimension in Engineering. Stanley R. Harris. *Oil and Gas Journal*, v. 53, Nov. 8, 1954, p. 163-164.

Models of proposed structures simplify and clarify design details as compared to drawings. Photographs.

2384 Putting Data on Microfilm Fast, Accurate, Inexpensive. Carl Cline and Carroll F. Knutson. *World Oil*, v. 139, Nov. 1954, p. 81-82.

On-the-spot microfilming an asset in collecting information for reports. Photographs, table. 3 ref.

See also:
1746 (coding for machine solution of chemical problems)
2932 (information service of B.N.F.M.R.A.)

INSTRUMENTATION AND LABORATORY APPARATUS

2385* Ion Pump. (English.) P. F. Váradi. *Acta Technica Academiae Scientiarum Hungaricae*, v. 9, nos. 3-4, 1954, p. 343-353.

Description and characteristics of vacuum pump. Diagrams, graphs. 7 ref.

2386 An Automatic Coulometric Titrimeter. N. Bett, W. Nock, and G. Morris. *Analyst*, v. 79, Oct. 1954, p. 607-616 + 1 plate.

Equipment described can titrate 25 ml. of acid or alkali in 5 min. with a deviation of less than 0.2%. Tables, diagrams, circuits. 19 ref.

2387 A Twin-Beam Null-Point Fluorimeter for the Analysis of Liquid Samples. J. P. Dowdall and H. Stretch. *Analyst*, v. 79, Oct. 1954, p. 651-655.

Measures fluorescence at a given stage during a reaction. Circuit, graph, sketch.

2388* High-Frequency Titration. **Die Hochfrequenztitration.** (German.) K. Cruse and R. Huber. *Angewandte Chemie*, v. 66, no. 20, Oct. 21, 1954, p. 625-633.

Types of equipment. Heterodyne apparatus is described. Photograph, diagrams, graphs, circuits. 51 ref.

2389 An Instrument for Leak Detection and Pressure Measurement in High Vacuum Systems. Edouard G. Leger. *Canadian Journal of Technology*, v. 32, Nov. 1954, p. 199-205.

Measurement of gas pressure in range from 10^{-1} to 10^{-7} mm. of Hg. Diagram, circuit. 8 ref.

2390 Mass Spectrometry. A Modern Industrial Tool. B. F. Dudenbostel, Jr. and William Priestley, Jr. *Chemical and Engineering News*, v. 32, Nov. 29, 1954, p. 4736-4740.

Equipment; methods; applications. Diagram, photographs, table.

2391 A Density Sensitive Device. R. M. Butler and A. C. Plewes. *Chemistry in Canada*, v. 6, Nov. 1954, p. 52, 54.

Instrument for continuous analysis of streams entering and leaving a chemical plant. Capable of detecting concentration changes of the order of 0.1%. Diagram, graphs, table.

2392 A Laboratory Mechanical Shaker. P. D'Ath and E. Smart. *Chemistry & Industry*, 1954, no. 41, Oct. 9, p. 1253-1254.

Simple and inexpensive equipment. Diagram, photograph.

2393 Demonstration of the Principles of the Ultrasonic Flowmeter. R. C. Swengel, W. B. Hess, and S. K. Waldorf. *Electrical Engineering*, v. 73, Dec. 1954, p. 1082-1084.

By transmitting ultrasonic frequency both upstream and downstream between two fixed transducers, large vol. of a liquid can be measured with great sensitivity. Photographs, diagrams. 2 ref.

2394 A New Electrical Hygrometer. W. C. White. *Electrical Engineering*, v. 73, Dec. 1954, p. 1084-1087.

Basic element is an alumina core saturated with a solution which will absorb atmospheric moisture and become electrically conductive. Photographs, graphs. 1 ref.

2395* A New Electrical Device to Locate Leaks of Inflammable Gases. W. C. White. *Gas*, v. 30, Nov. 1954, p. 36-38.

Equipment and operation. Photographs, diagram. 4 ref.

2396* Microtitration of Organic Compounds. **Zur Mikrotitration organischer Verbindungen. I.** Semiautomatic Apparatus for Microtitration. **Halbautomatische Apparatur zur Mikrotitration.** (German.) W. Simon, E. Kováts, L. H. Chopard-dit-Jean, and E. Heilbronner. *Helvetica Chimica Acta*, v. 37, no. 6, Oct. 15, 1954, p. 1872-1885.

Includes diagrams, tables, graphs. 7 ref.

2397 Special Instruments for the Steel Industry. W. A. Black. *Instruments and Automation*, v. 27, Nov. 1954, p. 1786-1791.

Ultrasonic inspection and thickness gaging, X-ray thickness gaging, blooming-mill torque control, open-hearth crane analyses, and electrical weighing. Development of special depth and crack indicators. Photographs, diagrams, graph.

2398 Measurement Technique for High Vacuum. Kenneth Roach. *Instruments and Automation*, v. 27, Nov. 1954, p. 1792-1794.

Classification and choice of gages; mean-free-path and pressure measurements. Diagram, table. 19 ref.

2399 Scale and Reading Errors of Electrical Indicators. Frank D. Weaver. *Instruments and Automation*, v. 27, Nov. 1954, p. 1812-1814.

Sources of errors are analyzed, and the N.B.S. standard calibration methods presented. Graphs, photographs, table. 2 ref.

2400 Instrumentation of Modern By-Product Coke Ovens. E. T. W. Bailey. *Instruments and Automation*, v. 27, Nov. 1954, p. 1815-1817.

Control system, utilizing pneumatic techniques, for fuel-gas pressures, stack draft, exhausters, and boosters. Photographs, diagrams.

2401* A Magnetic Balance for Ferro-Magnetic Materials. **Magnetisk våg för mätning av magnetiska momentet hos ferromagnetiska material.** (Swedish.) Olle Hedebrant. *Jernkontorets Annaler*, v. 138, no. 10, 1954, p. 643-654.

Description of a magnetic balance for the study of transformations and transformation kinetics in alloys. Photographs, diagrams, graphs, table. 5 ref.

2402 Calibration of a Nickel-Molybdenum Thermocouple. Richard D. Potter. *Journal of Applied Physics*, v. 25, Nov. 1954, p. 1383-1384.

Values of e.m.f. were determined up to 2242 F. Graph, table. 4 ref.

2403 A Student Polarimeter. Howard Nechamkin. *Journal of Chemical Education*, v. 31, Nov. 1954, p. 579-580.

Based on polaroid 3-D glasses. Photograph, diagrams.

2404 Dry Box Technique. S. Young Tyree, Jr. *Journal of Chemical Education*, v. 31, Nov. 1954, p. 603-605.

Includes plans, photograph, diagrams. 3 ref.

2405* An Improved Net-Radiation Instrument. V. E. Suomi, Matti Franssila, and Norman F. Islitzer. *Journal of Meteorology*, v. 11, Aug. 1954, p. 276-282.

Instrument for measuring the net flux of radiant energy through a surface parallel to the earth's surface. Photographs, diagrams, graphs, tables. 9 ref.

2406 A Rotational High Pressure Viscosimeter. Murray F. Hawkins, Jr. and Marion L. Kimmel. *Journal of Petroleum Technology*, v. 6, Nov. 1954, p. 31-33.

Instrument for measuring the viscosity of oils with gas in solution. Photograph, graphs, diagram. 3 ref.

2407* A 0.5-6 MeV Neutron Detector With Uniform Sensitivity as a Function of the Energy. **Un détecteur a neutrons de 0,5 à 6 MeV de sensibilité uniforme en fonction de l'énergie.** (French.) Philippe Eberhard. *Journal de physique et le radium*, v. 15, no. 11, Nov. 1954, p. 765-766.

Principles, characteristics, and measuring methods. Diagrams.

2408* Distribution of Delays in Geiger-Müller Counters. **Sur la distribution des retards dans les compteurs Geiger-Müller.** (French.) E. Picard and A. Rogozinski. *Journal de physique et le radium*, v. 15, no. 11, Nov. 1954, p. 767-775.

Oscillographic measurement of total time elapsing between entry of the particle and response of the amplifier. Graphs, diagrams, oscillogram, tables. 10 ref.

2409* Precision Rotation Viscometer With Electrostatic Restoring Torque for the Centipoise Range. H. Eisenberg and E. H. Frei. *Journal of Polymer Science*, v. 14, Nov. 1954, p. 417-426.

Designed for dilute high polymer and polyelectrolyte solutions. Operates from 2×10^{-5} to 1.6 dyne-cm.$^{-2}$. Photograph, diagrams, graphs. 6 ref.

2410 Sensitivity—A Criterion for the Comparison of Methods of Test. J. Mandel and R. D. Stiehler. *Journal of Research, National Bureau of Standards*, v. 53, Sept. 1954, p. 155-159.

Recommended to consider in place of precision and accuracy. Graphs, table. 12 ref.

2411 Refractivity Measurements on Thick Plates. James B. Saunders. *Journal of Research, National Bureau of Standards*, v. 53, Sept. 1954, p. 165-171.

Order of interference is independent of thickness. Diagrams, patterns.

2412 A Dial Gauge Testing Machine. D. C. Barnes and C. Barnett. *Machinery (London)*, v. 85, Oct. 15, 1954, p. 837-839.

Gages are tested continuously throughout the measuring range. Photograph, drawing.

2413 Instrumentation in the Iron and Steel Industry. B. O. Smith. *Metal Treatment and Drop Forging*, v. 21, Nov. 1954, p. 499-502.

New industrial and research equipment. Diagrams. 6 ref.

2414* The Use of ZnS Monocrystals as Actinic Screens in the Electron Microscope. **Zur Verwendung von ZnS-Einkristallen als Leuchtschirme im Elektronenmikroskop.** (German.) H. Arend, R. Broser-Warminsky, and E. Ruska. *Mikroskopie*, v. 62, no. 1, Oct. 1954, p. 46-64.

Includes table, diagrams, micrographs. 13 ref.

2415 Heat and Water Vapor Transmission Apparatus for Insulated Panels. *National Bureau of Standards, Technical News Bulletin*, v. 38, Nov. 1954, p. 157-159.

Design and principle; testing and performance. Photographs, diagram.

2416 What's the Score on Electronic Process Control? D. M. Boyd and Roger Gilliland. *Oil and Gas Journal*, v. 53, Nov. 8, 1854, p. 136-141.

How the electronic system works and typical installations. Diagrams, photographs, graphs.

2417 A Thixoviscometer for Production Control. C. B. W. Richardson. *Paint Technology*, v. 18, Oct. 1954, p. 47-50.

Description and operation of instrument for determining viscosity of thixotropic paint systems. Photographs, diagrams, graphs, tables.

2418* Operation of the Filled System Thermometer. L. E. Smith. *Refrigerating Engineering*, v. 62, Nov. 1954, p. 40-43; disc., p. 43, 78, 80.

Operating principles; limitations; corrective techniques. Diagrams.

2419 The Role of the Instrument Engineer in Industry and Production. The Operation and Maintenance of Modern Control Systems. C. M. Gilmour. *Sheet Metal Industries*, v. 31, no. 331, Nov. 1954, p. 923-925.

Includes diagrams, photographs. (To be continued.)

2420 Differential Thermal Analysis. F. W. Wilburn. *Society of Glass Technology, Journal*, v. 38, no. 183, Aug. 1954, p. 371T-382T + 1 plate.

Describes automatic apparatus in which the controlled heating rate is variable up to 20 C. per minute. Diagrams, graphs. 11 ref.

2421* The B.I.S.R.A. Profiloscope. A. E. Ranger. *Wire Industry*, v. 21, Oct. 1954, p. 1015-1018, 1021.

Instructions for use and interpretation of images obtained with instrument for checking wire drawing dies. Photographs, diagrams.

Information—Preparation and Dissemination

Books and Miscellaneous Publications

2422 Manual of the Polarizing Microscope. A. F. Hallimond. 2nd Ed. 204 p. 1953. Cooke, Troughton & Simms, York, England. (QH217 H15m2)

Limited to the discussion of microscopes and methods with emphasis on new accessory apparatus including the three-axis universal stage, microphotometer, preparation of polished sections, etc.

2423 Microscopical Techniques in Metallurgy. Henry Thompson. 146 p. 1954. Sir Issac Pitman & Sons, London. (TN690 T37m)

Recommended techniques in sampling and preparation of specimens; features of the metallurgical microscope, including description and application of the electron microscope; photo reproduction; color photography; flake and grain size determinations; and inclusion ratings.

See also:
1801 (instruments)
1827 (stability of analytical weights)
1836 (microphotometer)
1852 (ozonometer)
2010 (calorimeter)
2060 (measuring specific surface of powders)
2075 (potentiostat for corrosion)
2138 (voltmeters)
2181 (conductance measuring)
2240 (pulse counter)
2262 (portable velometer)
2548 (temperature controls)
2854 (instruments for the drilling industry)
2898 (cinenucleograph)
2902 (instruments for radiation studies)
3006 (length-measuring device)
3007 (testing of insulation materials)

LUBRICATION AND FRICTION

2424 Research in Bearings. C. M. Allen and W. H. Goldthwaite. *Battelle Technical Review*, v. 3, Nov. 1954, p. 113-117.

A critical review of the problems and the need for research in bearing development and design for newer mechanisms which operate under conditions of higher speeds and temperatures, in presence of corrosive lubricants, and which require suitable materials for movable joints. Micrographs, table.

2425* Dynamic Testing of Lubricating Greases. **Über eine dynamische Prüfung von Schmierfetten.** (German.) G. Spengler, W. Kullman, and G. Lohmann. *Erdöl und Kohle*, v. 7, no. 10, 1954, p. 636-639.

Use of "Kugelfischer" machine with automatic recording for continuous production control. Diagrams, graphs.

2426* The Short FZG Gear-Wheel Test for Testing Transmission Oils. Description of the Test, Testing Conditions, and Testing Results. **Der FZG-Zahnradkurztest zur Prüfung von Getriebeölen. Beschreibung des Testes, Testbedingungen und Testergebnisse.** (German.) G. Niemann and H. Rettig. *Erdöl und Kohle*, v. 7, no. 10, Oct. 1954, p. 640-642.

Studies of load resistance and wear of gear wheels. Determination of foaming tendency and corrosiveness of lubricants. Graphs, tables, photographs.

2427 Friction and Lubrication of Nylon. R. C. Bowers, W. C. Clinton, and W. A. Zisman. *Industrial and Engineering Chemistry*, v. 46, Nov. 1954, p. 2416-2419.

Friction properties and recommended lubricants. Tables. 19 ref.

2428* Marine Lubrication. G. H. Clark. *Institute of Marine Engineers, Transactions*, v. 66, Oct. 1954, p. 229-276.

Refining of lubricating oils; laboratory tests; use of additives; fundamentals and lubrication problems associated with reciprocating steam and Diesel engines, and geared steam turbines. Diagrams, tables, photographs, graphs. 21 ref.

2429 Symposium on Metal-Working Oils. I. Metal Cutting. *Institute of Petroleum, Journal*, v. 40, Sept. 1954, p. 243-276; disc., p. 276-290.

Includes "Mechanism of Friction and Lubrication in Metal-Working", F. P. Bowden and D. Tabor; "A Preliminary Investigation of the Effectiveness of Various Chlorinated Hydrocarbon Compounds as Cutting Oil Additives", K. J. B. Wolfe, M. D. Kinman, and G. Lennard; "Some Aspects of the Metal Cutting Process", Geo. V. Stabler; "Mechanical Testing of Cutting Oils", I. S. Morton and R. Tourret; "Satisfactory Records are Essential to the Economic Application of Cutting Fluids", H. Grisbrook; and "The Evaluation of Cutting Fluids With Special Reference to Practice in the U.S.A.", A. J. Chisholm.

2430 Lubrication Practices at Alan Wood Steel Company. R. G. Leister. *Iron and Steel Engineer*, v. 31, Nov. 1954, p. 138-142; disc., p. 142-143.

Improvements in lubrication practices resulted in better and more economical operation. Photographs.

2431* Coolants and Lubricating Agents in Band Sawing. M. A. Bergson. *Machine and Tool Blue Book*, v. 49, Nov. 1954, p. 151-154, 156.

Uses and types of agents to prolong band tool life, improve cut finish, and facilitate production. Photographs, table.

2432* Preparative Treatment of Metal Surfaces for Purposes of "Tinning" in the Pouring of Bearing Shells. **Zur vorbereitenden Behandlung der Metalloberflächen zwecks "Verzinnung" beim Ausgiessen von Lagerschalen.** (German.) Edmund R. Thews. *Metalloberfläche*, Ausgabe A, v. 8, no. 11, Nov. 1954, p. 165-171.

Proper cleaning and Sn coating of steel surfaces; fluxes; Cu-plating of bearing shells; bath compositions and plating conditions. Diagrams. 5 ref.

2433 High-Molecular-Weight Hydrocarbons in Petroleum. *Oil and Gas Journal*, v. 53, Nov. 15, 1954, p. 315-316.

Preparation, purification, and properties of model hydrocarbons in the lubricating-oil range to afford a better understanding of the behavior of oils.

2434 Identification of Pennsylvania Lubricating Oils by Refractivity Intercept. Richard Putscher and Mark Fred. *Petroleum Engineer (Management Edition)*, v. 26, Nov. 1954, p. C-13-C14, C-16.

Includes photographs, tables, graph. 6 ref.

2435* Proper Lubrication of Industrial Bearings. I. *Plant*, v. 10, Nov. 1954, p. 55-58.

Includes diagrams, photographs, micrographs.

2436* Present Day Pennsylvania Lubricants. W. C. Hulme. *Producers Monthly*, v. 18, Oct. 1954, p. 31-36.

Merits of Pennsylvania stocks are cited. Photographs, tables, diagrams, graphs.

2437 Silicone Oils and Greases. E. G. Jackson, H. F. Lamoreaux, and E. R. Booser. *Product Engineering*, v. 25, Nov. 1954, p. 154-157.

Data on stability, fluidity, and surface tension for extreme temperature applications; work aimed at offsetting disadvantages of low lubricity and high cost. Tables, graphs, photographs.

2438 Lubricants for Press and Forge Equipment. A. A. Paul. *Steel Processing*, v. 40, Nov. 1954, p. 703-704, 738-739.

Types of lubricants for various applications.

2439* Water and Air Bearings With Pressure Lubrication. **Wasser- und Luftlager mit Druckschmierung.** (German.) Fr. Gottwald. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 30, Oct. 21, 1954, p. 1005-1007.

Principles and mathematics of design; measurement of pressure and friction; applications. Diagram, graphs. 2 ref.

2440* Problem of Application of Radioactive Isotopes for Study of Wear of Machine Parts. **K voprosu primeneniia radioaktivnykh izotopov dlia izucheniia iznosa detalei**

mashin. (Russian.) P. E. D'iachenko. *Vestnik Mashinostroeniia*, v. 34, no. 9, Sept. 1954, p. 9-14.

Discusses the above in a general way, paying particular attention to machine parts that are not easily accessible to ordinary investigation, such as piston rings. Graphs, diagrams.

See also:
2350 (lubrication)
2471 (lubrication of gears)
2516 (lining of bearings)
2625 (wear resistant surface treatment)

MECHANICAL ENGINEERING

2441* Buckling of Stressed Bars of Heterogeneous Materials. (English.) P. Csonka. *Acta Technica Academiae Scientiarum Hungaricae*, v. 9, nos. 3-4, 1954, p. 391-403.

Stress analysis studies of concentrically-loaded built-up member. Diagrams, graphs. 5 ref.

2442 Energy Theorems and Structural Analysis. I. General Theory. J. H. Argyris. *Aircraft Engineering*, v. 26, Oct. 1954, p. 347-356.

Application of principles of virtual displacements and virtual forces. Diagrams, graphs. 13 ref. (To be continued.)

2443* Design of a Reciprocating Oil Intensifier. Frederick J. Shaltz. *Applied Hydraulics*, v. 7, Nov. 1954, p. 55-56.

Means of stepping up low pressure pump output to meet high pressure requirements. Diagrams.

2444* How to Care for Hydraulic Oils. John R. McCoy. *Applied Hydraulics*, v. 7, Nov. 1954, p. 64-67, 104.

Attention directed to reservoir design, oil contaminants, types of filters and filter circuits for increasing life of hydraulic oil and eliminating system failures. Photographs, diagrams.

2445* "Power in a Smaller Package"—Evaluating of 5000 psi Hydraulic Systems. Joseph N. Steinmetz, Jr. *Applied Hydraulics*, v. 7, Nov. 1954, p. 80 + 5 pages.

Comprehensive study of high pressure hydraulics applied to aircraft; advantages and disadvantages. Diagrams.

2446 IRD Frequency-Response Symposium. *ASME, Transactions*, v. 76, Nov. 1954, p. 1145-1393.

Twenty papers presented on the use of frequency response for checking differential equations, diagnosing malfunctioning of equipment, and synthesis and direct design of automatic controls. Graphs, diagrams, photographs, circuits, tables. 482 ref.

2447* Hydraulic and Pneumatic Servos. II. Improving Servo Performance. R. Hadekel. *Automation*, v. 1, Nov. 1954, p. 49-58.

Development of various methods of modifying servos to achieve the required performance and response characteristics. Graphs, diagrams. 10 ref.

2448* New Vistas in Stamping. Francis J. Sehn. *Automation*, v. 1, Dec. 1954, p. 18-26.

Automatic unloading removes the weak link and makes a reality of the high production capacities of presses. Photographs, diagrams.

2449* Hydraulic and Pneumatic Servos. III. Basic Servo Elements. R. Hadekel. *Automation*, v. 1, Dec. 1954, p. 43-52.

Techniques for improving servo performance by means of passive networks or subsidiary loops. Diagrams, graphs, circuits. 1 ref. (To be continued.)

2450* Automatic In-Process Gaging. I. Albert C. Sanford. *Automation*, v. 1, Dec. 1954, p. 57-62.

Introduces continuous machine control gaging as a means toward improved production. Photographs. (To be continued.)

2451* Automatic Control Terminology. Types of Controller Action. *Automation*, v. 1, Dec. 1954, p. 63-65.

Includes terms from "positioning action" to "sampling action". Diagrams, graphs.

2452 Poppet Valves, Guides and Seats. II. Valve Guides, Seat Inserts and Other Considerations. *Automobile Engineer*, v. 44, Oct. 1954, p. 421-428.

Types, causes, and corrective measures for valve failures. Diagrams, photographs. 38 ref.

2453* The Use of Continuous Feeders in Boilerhouse Coal Handling. **Der Einsatz von Stetigförderern in der Kesselbekohlung.** (German.) A. Fackelmeyer. *Brennstoff-Wärme-Kraft*, v. 6, no. 10, Oct. 1954, p. 387-390.

Description, evaluation, and illustration of different types of feeders. Photographs, diagrams. 1 ref.

2454 The Experimental Determination of the Speed of a Vacuum Pump and of Components of a Vacuum System. C. W. Oatley. *British Journal of Applied Physics*, v. 5, Oct. 1954, p. 358-362.

Includes diagrams, graphs, tables. 4 ref.

2455* High Vacuum Technique. Vacuum Refining; Materials of Construction; Ultra-High Vacuum Techniques; Gauges. S. L. Martin. *Chemical & Process Engineering*, v. 35, Oct. 1954, p. 301-305.

Dezincing of Pb, system design, and gaging are reviewed. Table, graph, diagrams. 19 ref.

2456* Flywheel Oscillation Dampers. Sidney A. Davis. *Control Engineering*, v. 1, Dec. 1954, p. 29-32.

Theory of operation, features, and method of proper damper selection. Photographs, diagrams, graphs, circuits, tables.

2457 Method of Curvature Determination for Curvilinear Cams. R. Beyer. *Engineers' Digest*, v. 15, Oct. 1954, p. 420-425. (From *Industrie-Anzeiger*, v. 76, no. 54, July 6, 1954, p. 27-32.)

Design and production. Diagrams, graphs. 8 ref.

2458 Three-Dimensional Stress Functions. H. L. Langhaar and M. Stippes. *Franklin Institute, Journal*, v. 258, Nov. 1954, p. 371-382.

Compatibility equations for an isotropic Hookean body subjected to boundary stresses and temperature gradients in terms of Maxwell stress functions; general solution for steady temperature fields. 6 ref.

2459 Work—A Discussion of Its Engineering Significance. F. W. Hutchinson. *Heating and Ventilating*, v. 51, Dec. 1954, p. 76-86.

Types of work; energy relations; application of work to operation of machines. Diagrams.

2460 Mechanical Seals for Centrifugal Pumps. Igor J. Karassik and Roy Carter. *Heating and Ventilating*, v. 51, Dec. 1954, p. 92-94.

Packing types and gland inserts. Photograph, diagram.

2461* Control-Valve Flow Characteristics. Paul Wing, Jr. *Instrument Engineer*, v. 1, Oct. 1954, p. 115-123.

Inherent flow characteristics; valve-design limitations; selection of proper characteristics. Graphs, diagrams. 11 ref.

2462 Uses of Resistance Wire Type Strain Gages in Steel Plants. W. A. Black. *Iron and Steel Engineer*, v. 31, Nov. 1954, p. 57-63.

Stress and load analysis of mill equipment. Diagrams, photographs, graphs.

2463 Finite Plane Strain for Orthotropic Bodies. A. E. Green and E. W. Wilkes. *Journal of Rational Mechanics and Analysis*, v. 3, Nov. 1954, p. 713-723.

The flexure of a cuboid is solved in terms of a general strain energy function. 5 ref.

2464 Design Manual on Nonmetallic Gaskets. *Machine Design*, v. 26, Nov. 1954, p. 157-188.

Practical guide to current design techniques in gasket requirements, materials and uses, designing gasketed joints, and specifications and testing. Diagrams, photographs, tables, graph. 20 ref.

Mechanical Engineering

2465 Planning Machine Series. V. Paolo Tedeschi. *Machine Design*, v. 26, Nov. 1954, p. 195-207.

Attention given to practical problems requiring special methods of attack for series planning and representative types of machines to be treated. Diagrams, graphs, tables, photograph.

2466 Beams With Nonuniform Loading. F. C. Bragg. *Machine Design*, v. 26, Nov. 1954, p. 213-216.

Determination of reactions at beam supports. Tables, diagrams, graphs.

2467* Kinetics and Thermodynamics of Grinding Processes. **Zur Kinetik und Thermodynamik der Zermahlungsvorgänge. II.** The Use of Radioactive Isotopes. **Die Anwendung radioaktiver Isotope.** (German.) G. F. Hüttig, W. Simm, and G. Glawitsch. *Monatshefte für Chemie*, v. 85, no. 5, Oct. 15, 1954, p. 1124-1132.

Study of ordinary glass and glass tagged with ^{60}CO ground in a ball mill. Table, diagram, graphs. 6 ref.

2468* **Ship Structural Members. VI.** J. McCallum. *North East Coast Institution of Engineers & Shipbuilders, Transactions*, v. 71, Nov. 1954, p. 25-49.

Stress analysis of plates stiffened by flat bars. Diagrams, graphs. 6 ref.

2469 Secondary Stresses in Buried High Pressure Pipe Lines. M. G. Spangler. *Petroleum Engineer (Management Edition)*, v. 26, Nov. 1954, p. D6-D10, D12.

Primary sources are backfill and traffic loads; stress magnitude in combination with stresses caused by internal fluid pressure. Diagrams, graphs, tables. 5 ref.

2470 Remote Valve Operators. Burt Olive, Jr. and M. M. Heller. *Petroleum Engineer (Management Edition)*, v. 26, Nov. 1954, p. D13-D18, D20.

Equipment for driving and controlling. Photographs, diagrams.

2471* Heavy-Duty Gears. II. M. S. Clark. *Pit and Quarry*, v. 47, Nov. 1954, p. 103-106, 108.

Types of failures. Lubrication principles. Photographs, graph.

2472 Avoiding Gear Tooth Interference. Reiner J. Auman. *Product Engineering*, v. 25, Nov. 1954, p. 207, 209, 211, 213.

Simple, direct method of calculating maximum diametral pitch that can be used without undercutting or using non-standard tooth forms. Graphs.

2473 Efficient Piping of Compressed Air. Leo Walter. *Rock Products*, v. 57, Nov. 1954, p. 84-86, 112-113.

Suggested modernization of air line piping includes automatic draining to eliminate water or oil, installation of adequate strainers, and use of air filters. Diagrams.

2474 The Optimum Design of Compression Surfaces Having Unflanged Integral Stiffeners. E. J. Catchpole. *Royal Aeronautical Society, Journal*, v. 58, Nov. 1954, p. 765-768.

Rapid determination of the optimum cross-section dimensions. Diagrams, graphs. 8 ref .

2475 The Dynamic Lateral Instability of Beams. J. F. Davidson. *Royal Society, Proceedings*, v. 226, ser. A, Oct. 21, 1954, p. 111-128.

Analysis of the vibrations of a deep slender beam, bent to uniform curvature by invariant moments acting in a vertical plane which is also the plane of maximum stiffness. Graphs, tables. 11 ref.

2476* The Automatic Factory. Machine Industries. **Den automatiske fabrikk. Maskinindustrien.** (Norwegian.) S. P. Andersen. *Teknisk Ukeblad*, v. 101, no. 34, Sept. 23, 1954, p. 735-743.

Discussion of modern mechanical, magnetic, and electronic control of machine tools and production processes. Diagrams, photographs.

2477* Pumps—Types and Principles. George E. Symons. *Water & Sewage Works*, v. 101, Nov. 1954, p. 485-489.

Classification by operating principle and use, methods of operation, and sources of power for pumping. Diagrams, photographs. 5 ref.

2478* Mechanics of Tool Engineering. XV. Selection of Manufacturing Equipment. Andrew E. Rylander. *Western Machinery and Steel World*, v. 45, Nov. 1954, p. 89-92.

Pros and cons of standard and special tools. Photographs.

2479* Allowable Working Stress for Springs. Harold C. R. Carlson. *Wire and Wire Products*, v. 29, Nov. 1954, p. 1318-1323, 1359, 1361.

Types of service. Curves for allowable stresses under various conditions. Design formulas. Tables, graphs. 19 ref.

2480* Regularities and Limiting Values of Torsional Vibration Frequencies. **Gesetzmässigkeiten und Grenzwerte von Drehschwingungsfrequenzen.** (German.) H. Neuber. *Zeitschrift für angewandte Mathematik und Mechanik*, v. 34, nos. 8-9, Aug.-Sept. 1954, p. 318-320.

Brief mathematical discussion. Table, diagrams.

2481* Substitution of the Stress on the Edge of a Perforation of an Elliptically Perforated Disk by Stressing the Unperforated Disk. **Ersatz der Lochrandbelastung einer elliptisch gelochten Scheibe durch eine Belastung der ungelochten Scheibe.** (German.) G. Sonntag. *Zeitschrift für angewandte Mathematik und Mechanik*, v. 34, nos. 8-9, Aug.-Sept. 1954, p. 330-331.

Mathematical examples of a relationship which may be an aid to new solutions in the plain elasticity theory. Diagrams. 2 ref.

Books and Miscellaneous Publications

2482 Packaging Engineering. Louis C. Barail. 407 p. 1954. Reinhold Publishing Corp., New York. (HF5770 B23p)

New methods and materials; their applications in all types of industrial packaging.

2483 Form in Engineering Design. J. Beresford-Evans. 96 p. 1954. The Clarendon Press, London. (T345 B45f)

Studies of techniques which can be used by draftsmen to give their products a fine and lasting appearance.

2484 Making the Automatic Factory a Reality. John T. Diebold. 71 p. 1951. (TJ215 D56m)

Man's role in our industrial processes; factors to consider in mechanizing jobs; feasibility and extent of automatic production; automatic controls.

2485 Discontinuous Automatic Control. Irmgard Flügge-Lotz. 168 p. 1953. Princeton University Press, Princeton, N. J. (TJ213 F67d)

Mathematical treatment of position and velocity control.

2486 Transient Analysis of Alternating-Current Machinery. Waldo V. Lyon. 310 p. 1954. Technology Press of Massachusetts Institute of Technology and John Wiley & Sons, New York. (TK2711 L99t)

Identifies the method of symmetrical components as a means of determining the transient behavior of polyphase machines under different operating conditions.

2487 Symposium on Automatic Production of Electronic Equipment. 119 p. 1954. Stanford Research Institute, Stanford, Calif. (TJ215 Sy68p)

Product design and construction techniques. Design of automatic production lines.

See also:

1802 (water supply practice)
2099 (design of sprayers)
2122 (hydrogen cooling of turbo-generators)
2146 (torque measuring)
2385 (vacuum pump)
2651 (strength of pressure vessels)
2657 (stress analysis)
2674 (structural fatigue)
2678 (stress-strain relations)
2729 (impulsive loading of metals)
2760 (design of press tools)
3003 (vibration theory)
3027 (single screw extruder for plastics)

3031 (analytical study of single screw extruders)
3115 (reciprocating compressors)

METALLURGY

2488 Re-Melt Shell Casing Scrap. E. D. Boyle. *American Foundryman*, v. 26, Nov. 1954, p. 44-47.

Equipment and techniques. Photographs, diagram.

2489 Purity in Metals Aids Their Use. Bruce W. Gonser. *Battelle Technical Review*, v. 3, Dec. 1954, p. 129-130.

Benefits of impurity removal. Results of adding trace elements to high purity metals.

2490 Sweden's Iron Ore. T. L. Joseph. *Blast Furnace and Steel Plant*, v. 42, Nov. 1954, p. 1281-1291.

Compositions, physical properties, production, distribution of exports, and uses. Tables, graphs, map, flowchart, photographs. 8 ref.

2491 Nitrogen-Alloyed High Speed Steel. V. I. Prosvirin and I. R. Ushevskii. *Henry Brutcher, Altadena, Calif., Translation no.* 2931, 18 p. (From AZOT V STALI. ("NITROGEN IN STEEL"), 1950, p. 140-160.)

Study of experimental steels for influence of N on austenite grain size, quantity of retained austenite, secondary hardness, martensite transformation during tempering, and cutting performance. Tables, micrographs, graphs.

2492 The Aluminum Body of the New Dyna-Panhard Automobile. J. J. Baron. *Henry Brutcher, Altadena, Calif., Translation no.* 3381, 24 p. (From *Aluminum*, v. 30, no. 5, 1954, p. 183-194.)

Design; operation; production methods. Tables, photographs.

2493 Modern Trends in Hollow Drill Steel. B. M. Hamilton. *Canadian Mining and Metallurgical Bulletin*, v. 47, no. 511, Nov. 1954, p. 748-755; *Canadian Institute of Mining and Metallurgy, Transactions*, v. 57, 1954, p. 486-493.

Development and properties of alloy tool steels for making rock drills. Graphs, tables, photographs.

2494* Influence of Copper in Steel. **Influence du cuivre dans l'acier.** (French.) Blanchard. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques*, v. 11, no. 11, 1954, p. 2135-2141.

Effects on mechanical properties, corrosion resistance, and surface defects that occur during rolling and forging. 5 ref.

2495* (High-Melting Metals and Their Alloys as Raw Materials for the Construction of Apparatus.) **Hochschmelzende Metalle und deren Legierungen als Werkstoffe für den Apparatebau.** (German.) F. Benesovsky and K. Sedlatschek. *Chemie-Ingenieur-Technik*, v. 26, no. 10, Oct. 1954, p. 538-543.

Discussion of production, processing, and behavior toward all types of corrosion, and specific fields of applications. Tables. 14 ref.

2496 Non-Ferrous Data for the Chemical Engineer. W. H. L. Hooper and N. P. Inglis. *Chemistry & Industry*, 1954, no. 44, Oct. 30, p. 1334-1348.

Mechanical properties, corrosion, and welding of Cu, Al, Ti, and Ag alloys. Photographs, graphs, tables, micrographs. 5 ref.

2497 Some Tests on the Stability of 25/20 Stainless Steel for Analytical Weights. E. R. Harrison. Commonwealth of Australia, Dept. of Supply, Defence Standards Laboratories Technical Note 18, Dec. 1953, 7 p. (T177 A78.2t)

Stability and corrosion resistance are satisfactory. Table, graphs. 5 ref.

2498* High-Vacuum, High-Temperature Furnace. *Edgar Allen News*, v. 33, Nov. 1954, p. 241-242.

Electrically-heated carbon tube furnace designed for melting, annealing, and sintering. Tables.

2499* Large Diameter Aluminium Tubes in Structures. Cedric Marsh. *Engineer*, v. 198, Oct. 29, 1954, p. 584-586.

Use of tubes formed from sheet as a structural medium, and the economic and design reasoning for its application. Diagrams, graphs.

2500 Stiffened-Panel Construction With Light Alloys. *Engineering*, v. 178, Oct. 29, 1954, p. 570-571.

Fabrication and welding methods of transport units. Photographs, diagrams.

2501 High Alloy Castings in Heat Treating Resist High Temperature Conditions. *Industrial Heating*, v. 21, Oct. 1954, p. 1999 + 4 pages.

Successful industrial applications of three basic groups of heat resistant alloy castings and examples to show how they provide various combinations of mechanical properties and hot gas corrosion resistance. Photographs.

2502* Ion Exchange Materials in the Metallurgical Industries. T. R. E. Kressman. *Institute of Metal Finishing, Bulletin*, v. 4, Autumn 1954, p. 219-226.

Water softening and demineralization; recovery of metals from waste liquors and rinse waters. 5 ref.

2503 Modern Steel Plant Teams Continuous Casting With Planetary Mill. E. C. Beaudet. *Iron Age*, v. 174, Nov. 4, 1954, p. 113-120.

Advanced equipment for production of stainless steel billets with high percentage of yield from molten to semi-finished steel. Photographs, diagrams.

2504 High-Strength Weldable Steel. W. E. Bardgett and L. Reeve. *Iron & Steel*, v. 27, Nov. 1954, p. 514-518.

Mechanical properties, machinability, corrosion resistance, and applications. Tables, graphs, diagram, photographs. 3 ref.

2505 Jones & Laughlin Pittsburgh Works. T. J. Ess. *Iron and Steel Engineer*, v. 31, Nov. 1954, p. 76-102 + 6 plates.

Details of equipment, plant layout, and operations from ore, coal, and limestone to finished products. Photographs, map, tables, drawings.

2506 The Iron and Steel Industry of Finland. Charles F. Goodeve. *Iron and Steel Institute, Journal*, v. 178, Nov. 1954, p. 219-222.

Capacities, facilities, and technical developments. 7 ref.

2507* Copper and Copper Alloys. **Koper en koperlegeringen. XIV.** Special Brass. **Speciaal messing.** (Dutch.) W. G. R. de Jager. *Metalen*, v. 9, no. 19, Oct. 15, 1954, p. 310-313.

Tables of dimensions and mechanical properties of the commercially available types of brass products. 14 ref. (To be continued.)

2508 Rare-Earths in Metallurgy. H. Evans. *Metal Industry*, v. 85, Oct. 29, 1954, p. 365-367, 374.

Occurrence, extraction, and applications. Effects of additions to various alloys. Tables, graphs, micrographs. 10 ref.

2509 Carbide Tools for Non-Cutting Uses. J. Witthoff. *Metal Treatment and Drop Forging*, v. 21, Oct. 1954, p. 456-462.

Advantages of using sintered carbides for dies, punches, and other forming tools. Photographs, tables.

2510 A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging*, v. 21, Oct. 1954, p. 477-484.

Covers "notch brittleness" to "oriental amethyst". (To be continued.)

2511* Titanium in Jet Engines. D. C. Goldberg. *Modern Metals*, v. 10, Nov. 1954, p. 46, 48, 50, 52.

Production, alloy systems, fabrication problems, mechanical properties, and required research. Diagram, photographs, tables, graph.

2512* Titanium. **Titan.** (German.) A. von Zeerleder, A. Koller, and E. Koelliker. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 20, no. 9, Sept. 1954, p. 273-290.

Literature review on the history, sources, production, metallurgy, and properties of Ti and its alloys; a survey of present status and future prospects. Tables, charts, photograph, diagrams, graphs. 55 ref.

Metallurgy

2513* Effect of Oxygen on the Structure and Aging of Pure Iron. **Der Einfluss von Sauerstoff auf Gefüge und Alterung von reinem Eisen.** (German.) Franz Wever, Wilhelm Anton Fischer, and Helmut Engelbrecht. *Stahl und Eisen*, v. 74, no. 23, Nov. 4, 1954, p. 1521-1526.

Characteristics of molten Fe; structure, notched bar toughness, and hardness effects of O and temperature. Photographs, graphs, micrographs. 10 ref.

2514* **Recent Developments in Cast Iron.** S. B. Bailey. *Times Science Review*, 1954, Winter, p. 6, 8.

Development, properties, and applications of gray, malleable, and nodular cast irons. Photographs.

2515* **Graphitic Tool Steels in the Press Room.** Lester F. Spencer. *Tool Engineer*, v. 33, Dec. 1954, p. 97-101.

Structures, properties, and advantages for forming tools. Photograph, micrographs, tables, graphs. 4 ref.

2516* Improvement in Bearings Lined With Lead Bronze. **Uluchshenie podshipnikov, zalitykh svintsovistoi bronzoi.** (Russian.) Iu. Ia. Zil'berg. *Vestnik Mashinostroeniia*, v. 34, no. 10, Oct. 1954, p. 28-30.

Application of Pb-Sn-Sb alloy in thicknesses from 20 to 55 microns, to the Pb bronze lining of bushings for heavy-duty diesel tractor bearings. Diagrams, photograph, photomicrograph.

2517* **Knotty Materials Problems for Structural Efficiency Posed by Jet Age Speed Boost.** Spencer L. Shaw. *Western Metals*, v. 12, Nov. 1954, p. 59-61.

Problems posed by aerodynamic heating in future aircraft. Diagrams, graphs, tables.

2518* Hardenable Copper Alloys. **Aushärtbare Kupferlegieurungen.** (German.) Rudolf Reinbach. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 7, no. 10, Oct. 1954, p. 441-446.

Importance of hardenable alloys; principles of hardening; heat-treating for hardness; properties and uses of hardenable Cu-Be, Cu-Cr, Cu-Mn-Ni, and Cu-Ni-Si alloys. Graphs, micrographs, table, photographs. 6 ref.

Books and Miscellaneous Publications

2519 The Science of Dental Materials. Eugene W. Skinner. 4th Rev. Ed. 456 p. 1954. W. B. Saunders Co., Philadelphia. (RK652.5 Sk34s4)

Physical materials; plaster and dental stone; prosthetic materials; denture resins; non-metallic materials; porcelain and silicate cement; self-curing resin; amalgam; casting procedures; Au and Cr alloys.

2520 Facts About Zirconium. 64 p. 1954. Carborundum Metals Co., Akron, N. Y. (TN799.Z4 C17f)

Refining methods, properties, and applications.

2521 Handbook on Titanium Metal. 7th Rev. Ed. 93 p. 1953. Titanium Metals Corp. of America, New York. (TN799.T5 T53h)

Methods of production, physical and mechanical properties, corrosion resistance, and fabricating practices.

See also:
2164 (applications of plated wire)
2851 (properties of drill rods)
2882 (applications and properties of Be, Cr, and U)

METALS—EXTRACTION AND REFINING

2522 Hydrogen in Steelmaking. H. Epstein, J. H. Walsh, and T. B. King. *American Iron and Steel Institute, Preprint*, 1954, 23 p. (TS300 Am35ta)

Measures for limiting H content include vigorous boil, prompt tapping; good ladle, runner, and mold practice; and low moisture in addition materials. Graphs, tables, diagrams. 15 ref.

2523* **The Use of Gaseous Oxygen in Open Hearth and Converter Steelmaking.** D. J. O. Brandt. *British Steelmaker*, v. 20, Nov. 1954, p. 428-434.

Economics, technical advantages, and techniques in current use. Diagrams, graphs, photographs.

2524 Equilibrium and Heat Effect of Aluminum Subchloride Reaction. P. Weiss. *Henry Brutcher, Altadena, Calif., Translation no.* 2949, 14 p. (From Erzmetall, v. 3, no. 8, 1950, p. 241-244.)

Exploration of possibility of producing high-purity Al from cheaper materials and of recovering pure Al from ore without the necessity of electrolysis. Graphs. 17 ref.

2525 Melting of the Iron-Chromium-Aluminum Alloy 'Fekhral'. L. V. Marmorshtein. *Henry Brutcher, Altadena, Calif., Translation no.* 3180, 25 p. (From IRON-CHROMIUM-ALUMINUM ALLOYS, 1950, Mashgiz, Moscow, p. 28-46.)

Commercial production of 'Fekhral' alloys having the following composition range: 0.15% C, max., 0.30-1.00% Mn, 0.2-1.0% Si, 12-15% Cr, and 3.5-5.5% Al. Photographs, micrographs. 4 ref.

2526 Electrolytic Production of Ternary Alloys of Nickel With Iron and Molybdenum. T. F. Frantsevich-Zabludovskaya, I. N. Frantsevich, and K. D. Modylevskaya. *Henry Brutcher, Altadena, Calif., Translation no.* 3389, 10 p. (Condensed from *Zhurnal Prikladnoi Khimii*, v. 27, no. 4, 1954, p. 413-420.)

Previously abstracted from original. See item 11487, v. 3, Aug. 1954.

2527 Mechanism of Occurrence of Overvoltage at Carbon Anode in the Electrolyte Production of Aluminum. S. I. Rempel and L. P. Khodak. *Henry Brutcher, Altadena, Calif., Translation no.* 3391, 15 p. (From *Zhurnal Prikladnoi Khimii*, v. 26, no. 9, 1953, p. 931-940.)

Previously abstracted from original. See item 5245, v. 3, Apr. 1954.

2528 On the Combustion Zones in Front of the Blast Furnace Tuyeres. W. Kuczewski and K. Moszoro. *Henry Brutcher, Altadena, Calif., Translation no.* 3396, 22 p. (Abridged from *Hutnik*, v. 20, no. 12, 1953, p. 361-367.)

Previously abstracted from original. See item 4996, v. 3, Apr. 1954.

2529 Continuous Casting of Alloy Steel Billets. T. H. Adair. *Canadian Mining and Metallurgical Bulletin*, v. 47, no. 511, Nov. 1954, p. 740-747; *Canadian Institute of Mining and Metallurgy, Transactions*, v. 57, 1954, p. 478-485.

Review of machines and techniques developed since 1842 and details of Rossi-Junghans machine at Atlas Steels, Ltd. Diagrams, photographs, flow charts.

2530* Half Siliceous, Half Basic Roofs. **Voûtes mi-siliceuses, mi-basiques.** (French.) Donney. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques*, v. 11, no. 11, 1954, p. 2081-2086.

Compares results of runs of open-hearth furnaces with basic roofs or siliceous roofs with those with half basic—half siliceous roofs. Economic advantages. Diagrams.

2531* Production of Semi-Hard Carbon Steels. **Élaboration des aciers demi-durs au carbone.** (French.) Royer. *Centre de Documentation Sidérurgique Circulaire d'Informations Techniques*, v. 11, no. 11, 1954, p. 2125-2134.

Use of electric steel making furnace. Analysis of slags just before tapping (after killing), in the ladle immediately after pouring from the furnace, and in the ladle at the end of casting. Tables, graphs. 5 ref.

2532 On the Way: More Zirconium for Nuclear Reactors. *Chemical Engineering*, v. 61, Dec. 1954, p. 112-114, 116.

Steps in the production and purification of Zr sponge. Photographs, diagram.

2533 Chemical Engineering Aspects of Titanium Metal Production. R. L. Powell. *Chemical Engineering Progress*, v. 50, Nov. 1954, p. 578-581.

Raw materials; chlorination; purification procedures. Reduction methods. Diagrams, table. 6 ref.

2534* Reduction of Titanium Dioxide by Calcium Silicides. Preparation of Titanium Silicides. **Réduction du bioxyde de titane par les siliciures de calcium. Préparation des siliciures de titane.** (French.) William Freundlich, André Chrétien, and Michel Bichara. *Comptes rendus*, v. 239, no. 18, Nov. 3, 1954, p. 1141-1143.

Use of Ca silicides as metallic oxide reducing agents to prepare Si alloys. Preparation of Ti_5Si and $TiSi_2$. Tables.

2535 Measuring Problems and Techniques at A-C Furnace Arcs. W. E. Schwabe. *Electrochemical Society, Journal*, v. 101, Nov. 1954, p. 554-559.

Experimental procedures for determining voltages in melting furnaces. Photograph, diagrams, graphs.

2536* Removal of Aluminum From Zinc-Containing Copper Alloys. **Zur Entfernung von Aluminium aus zinkhaltigen Kupferlegierungen.** (German.) Edmund R. Thews. *Giesserei*, v. 41, no. 21, Oct. 14, 1954, p. 571-573.

Review of literature on the removal of Al by oxidation, especially with the least loss of other components of the alloys. Tables. 18 ref.

2537 A Review of Developments in the Melting, Refining, and Casting of Copper. H. J. Miller. *Institute of Metals, Journal*, v. 83; *Institute of Metals, Bulletin*, v. 2, 1954, p. 167-172.

Trends in metal supplies; new processes; continuous casting; gas reactions in refining. 19 ref.

2538 Non-Metallic Inclusions. II. Deoxidation Products and Sulphides. H. B. Bell. *Iron & Steel*, v. 27, Nov. 1954, p. 531-537.

Reactions and effects of various combinations of Mn, Si, Al, Zr, Ti, and Ca. 69 ref.

2539 Non-Metallic Inclusions. III. Nitrides and Exogenous Types. H. B. Bell. *Iron & Steel*, v. 27, Dec. 1954 p. 559-565.

Amounts, structures, and effects of nitrides, oxidation during pouring, slag and refractory entrapment; inclusions and effects of alloying elements in cast iron; identification of inclusions. 83 ref.

2540 Effect of Secondary Checkers on Open Hearth Furnaces. H. S. Hall. *Iron and Steel Engineer*, v. 31, Nov. 1954, p. 112-122; disc., p. 122-126.

Secondary checkers increase production and reduce fuel requirements. Design and installation details. Graphs, diagrams, photographs.

2541 The Problem of Rupture of the Billet in the Continuous Casting of Steel. J. Savage and W. H. Pritchard. *Iron and Steel Institute, Journal*, v. 178, Nov. 1954, p. 269-277.

Measurements of friction between billet and mold, and of heat transfer through the mold wall. Method for preventing rupture. Diagrams, graphs. 15 ref.

2542 Chromium-Oxygen Equilibrium in Liquid Iron. E. T. Turkdogan. *Iron and Steel Institute, Journal*, v. 178, Nov. 1954, p. 278-283.

Influence of Cr-O interaction on deoxidation. Decarburization of Fe-Cr-C melts. Table, graphs. 17 ref.

2543 Furnace Operation and Casting Improved at Copper Cliff. Joseph C. Bischoff. *Journal of Metals*, v. 6, Nov. 1954, p. 1194-1196.

Practices and equipment for continuous production of Cu. Photographs, table. 2 ref.

2544 Thoughts on Lead Blast-Furnace Smelting. L. B. Haney and R. J. Hopkins. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Nov. 1954, p. 1208-1213; disc., p. 1213.

Factors affecting blast furnace operation based on experimental data. Table, diagram, graphs. 5 ref.

2545 The Recovery of Zinc From Dross. A. G. Thomson. *Metallurgia*, v. 50, no. 300, Oct. 1954, p. 159-160.

Basic principles and economic aspects.

2546* Electrical Dissociation of Molten Slag and Its Use in the Determination of the Basicity of Slag. **Die elektrische Dissoziation schmelzflüssiger Schlacken und ihre Anwendung zur Bestimmung der Schlackenbasizität.** (German.) Karlheinz Werner. *Metallurgie und Giessereitechnik*, v. 4, no. 9, Sept. 1954, p. 379-384.

Electrochemical and electrical behavior of open-hearth and electric furnace slags. Graphs, diagram, tables, photographs. 21 ref.

2547* Production of Titanium and Its Application. **Die Gewinnung des Titans und seine Anwendung.** (German.) Joachim Hedderich. *Metallurgie und Giessereitechnik*, v. 4, no. 9, Sept. 1954, p. 389-394.

Review of literature on production methods, properties, and uses of Ti and its alloys. Diagrams, tables, graph. 36 ref.

2548 Fuel Technology in the Iron and Steel Industry. L. H. W. Savage. *Metal Treatment and Drop Forging*, v. 21, Nov. 1954, p. 495-498, 502.

Heat requirements and losses; flame control; radiation research; temperature distribution in blast furnace foundations.

2549 Development of Continuous Casting of Steel. M. P. Newby. *Metal Treatment and Drop Forging*, v. 21, Nov. 1954, p. 506-508.

Research by the British Iron and Steel Research Association. Photographs.

2550* Technology of Acid Steel Production. **A savas acélgyártás technológiája.** (Hungarian.) András Tóth. *Öntöde*, v. 5, no. 6, June 1954, p. 130-137.

Hungarian experiments using electrical furnaces. Tables, diagrams.

2551* Steel Manufacture in the Induction Furnace. **Acélgyártás indukciós kemencében.** (Hungarian.) Endre Lendvai. *Öntöde*, v. 5, no. 10, Oct. 1954, p. 228-234.

Theory and practical application of resistance, electric arc, and induction furnaces. Diagrams. (To be continued.)

2552* Decarburization in the Open-Hearth Furnace. **Contribution à l'étude de la décarburation au four Martin.** (French.) Pierre Vallet. *Revue de métallurgie*, v. 51, no. 10, Oct. 1954, p. 709-722.

Theoretical treatment. Tables, graphs, diagrams. 12 ref.

2553* Checking the Basic Bessemer Conversion by the Brightness of the Flame. Application to the Conversion by the Oxygen-Water Vapor Mixture. **Controle de la conversion Thomas par la brillance de la flamme. Application à la conversion par le mélange oxygène-vapeur d'eau.** (French.) J. Daubersy. *Revue universelle des mines*, v. 10, ser. 9, no. 10, Oct. 1954, p. 642-654.

Use of photoelectric cells for continuous measuring of brightness. Graphs.

2554* The Performance of Silica Brick in the Open Hearth Roof. **Das Verhalten von Silikasteinen im Siemens-Martin-Ofengewölbe.** (German.) Kamillo Konopicky. *Stahl und Eisen*, v. 74, no. 22, Oct. 21, 1954, p. 1402-1413.

Refractoriness under load, effects of pore vol. and fluxes; permeability and durability. Tables, graphs. 26 ref.

2555* The New Large Blast Furnace of the Westfalenhütte Dortmund AG. **Der neue Grosshochofen der Westfalenhütte Dortmund AG.** (German.) Wilhelm Wolf, Franz Heppner, W. Güldner, and Paul Wolf. *Stahl und Eisen*, v. 74, no. 23, Nov. 4, 1954, p. 1456-1464.

Comparisons of American and German designs. Construction details and controls. Diagrams, photographs.

2556* Smelting of Mixed Ore-Coal Briquettes in the Low-Shaft Furnace.) **Verhütten von Erz-Kohle-Mischbriketts im Niederschachtofen.** (German.) Erich E. Hofmann. *Stahl und Eisen*, v. 74, no. 23, Nov. 4, 1954, p. 1464-1468.

Comparison with standard blast furnace practice; preparation of burden and operational experience. Diagrams, graphs.

2557* Blowing of Open Hearth Pig Iron With Oxygen Enriched Air in the Bottom Blown Converter. **Verblasen von**

Metals—Extraction and Refining

Stahleisen mit sauerstoffangereichertem Wind im bodenblasenden Konverter. (German.) Hans Kosmider, Herbert Neuhaus, and Arthur Weyel. *Stahl und Eisen*, v. 74, no. 23, Nov. 4, 1954, p. 1473-1485.

Blowability, dephosphorization, Mn slagging, N movement, heat requirements, and castability of the steel. Graphs, table. 12 ref.

2558* Blowability of Mixtures of Basic Bessemer and Open-Hearth Pig Iron in the Basic Converter. **Vom Thomasroheisen bis zum Stahlroheisen im basischen Konverter.** (German.) Erwin Eickworth and Theo Kootz. *Stahl und Eisen*, v. 74, no. 23, Nov. 4, 1954, p. 1486-1492.

Dephosphorization, N adsorption, Mn losses, and heat requirements. Graphs, tables. 10 ref.

2559* Experiments to Melt Pure Iron in High Vacuum. **Versuche zum Erschmelzen von reinem Eisen im Hochvakuum.** (German.) Franz Wever, Wilhelm Anton Fischer, and Helmut Engelbrecht. *Stahl und Eisen*, v. 74, no. 23, Nov. 4, 1954, p. 1515-1521.

Theoretical considerations of deoxydation by H and C under various conditions. Graph, diagrams, tables. 16 ref.

2560* Development of the Oxygen-Blowing Process of Producing Low-Nitrogen Steel. **Zur Entwicklung des Sauerstoff-Blasverfahrens für die Erzeugung von stickstoffarmem Stahl.** (German.) Arno Ristow. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 30, Oct. 21, 1954, p. 1004-1005.

New Austrian process and experience with this method of producing high-quality steel.

2561* Oxygen Converter Bids as Steel Industry's Bright New Tool for Lower Cost Production. J. W. Irvin. *Western Metals*, v. 12, Nov. 1954, p. 43-45.

Experience of Kaiser engineers on production of high quality, low C steel. Photographs, diagram, graphs.

See also:
1686 (steel plant refractories)
1693 (furnace roof life)
1695 (refractories for ladle linings)
1696 (ladle linings)
1697 (ladle and runner brick)
1698 (ladle brick)
2799 (physical chemistry of steel making)
2800 (physical chemistry of steel making)
2966 (smelting Western iron ore)
2967 (production of sponge iron)
3082 (steelmaking fume handling)

METALS—FINISHING, POLISHING, AND CLEANING

2562* Electrolytic Descaling. F. E. Cook, H. S. Preiser, and J. F. Mills. *American Society of Naval Engineers, Journal*, v. 66, Nov. 1954, p. 1005-1050.

Description of electrical method of rust removal from tanker ship compartments. Graphs, diagrams, tables, photographs. 28 ref.

2563 Good Phosphating Practice. H. A. Holden. *Electroplating and Metal Finishing*, v. 7, Nov. 1954, p. 416-418.

Emphasizes interdependence of various operations. Tables. 2 ref.

2564 Selection of Metal Cleaning Methods. *Electroplating and Metal Finishing*, v. 7, Nov. 1954, p. 420-424.

Techniques for cleaning various steel parts.

2565* Removal of Scale by High-Pressure Water. **Usuwanie zgorzeliny woda o wysokim ciśnieniu.** (Polish.) Zygmunt Polek. *Hutnik*, v. 21, no. 6, June 1954, p. 172-176.

Techniques and equipment for scale removal in connection with the rolling of sheet metal. Diagrams. 4 ref.

2566* Luster and Luster Impression. **Glanz und Glanzeindruck.** (German.) H.-D. Schulz-Methke. *Metalloberfläche*, Ausgabe A, v. 8, no. 11, Nov. 1954, p. 161-164.

Methods of determining structure and luster of metal surfaces; importance of objective methods of measuring luster. Diagram. 17 ref.

2567* An Improved Barrel Finishing Process. **Un procédé perfectionné de finissage au tonneau.** (French.) Sixten Arensten. *Métallurgie et la construction mécanique*, v. 86, no. 9, Sept. 1954, p. 683 + 5 pages.

Discusses treatment of Fe, steel, and most current metals in industry. Process consists in deburring, finishing, waxing, and polishing. Diagrams, photographs.

2568 The Technology of Liquid Buffing Compositions. Robert V. Twyning. *Plating*, v. 41, Nov. 1954, p. 1296-1299; disc., p. 1300.

Principles and practices for producing satisfactory finishes. 8 ref.

METALS—FOUNDRY PRACTICE

2569 How Coke Size—Screening—Handling Affect Cupola Melting. Woodrow W. Holden. *American Foundryman*, v. 26, Nov. 1954, p. 38-40.

Proper techniques save coke, increase melting rate, and promote maximum temperature. Photographs, graph, tables.

2570 System Sand Control. Morris Gittleman. *American Foundryman*, v. 26, Nov. 1954, p. 54-58.

Compromise between sand properties, equipment, and economy for efficient operation. Photographs, table.

2571 Intricate Investment Castings Require Shop "Savvy". John P. Wright. *American Machinist*, v. 98, Nov. 22, 1954, p. 120-125.

Guide for small jobbing shop practice. Photographs, diagrams.

2572* Simplification for Foundry Efficiency. J. Hunter. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, Oct. 1954, p. 416-440.

Significance of statistical data from 240 foundries concerning output in relation to size of foundry, costs, output per operator, personnel, and output in terms of production method. Tables, graphs.

2573* Suggestions for Simplification in Foundry Operations. A. A. Timmins. *British Cast Iron Research Association. Journal of Research and Development*, v. 5, Oct. 1954, p. 441-446.

Suggestions for minor improvement in pattern equipment, melting, molding, coremaking, and fettling.

2574 Statistical Research Into Productivity Increases at Electric Steel Foundries. W. Trommer. *Henry Brutcher, Altadena, Calif., Translation no.* 2939, 9 p. (Condensed from *Giesserei*, v. 38, no. 18, 1951, p. 422-426.)

Study of effect of increasing the charge weight in relation to the nominal furnace capacity upon production cost and upon steel quality, based on evaluation of 800 heats. Graphs, tables. 11 ref.

2575 Physicochemical Considerations Regarding the Operation of Acid and Basic Cupolas. H. Schmidt. *Henry Brutcher, Altadena, Calif., Translation no.* 3011, 21 p. (From *Giesserei, Technisch-Wissenschaftliche Beihefte*, 1952, nos. 6-8, p. 273-279.)

Cupola reactions involving S, CaC_2, and P. Graphs, tables. 8 ref.

2576 Use of Oxygen in the Melting of Low-Carbon Superheated Cast Iron (Malleable). V. A. Fuklev. *Henry Brutcher, Altadena, Calif., Translation no.* 3364, 11 p. (From *Liteinoe Proizvodstvo*, v. 5, no. 2, 1954, p. 1-3.)

Description of trial and full-scale runs in a 30-in cupola, blowing the molten iron with O in the forehearth. Graphs. 6 ref.

2577 Melting of Unbriquetted Fine Metal Scrap in the Cupola. Yu. S. Sukharchuk and M. P. Nikolaichik. *Henry Brutcher, Altadena, Calif., Translation no.* 3384, 9 p. (From *Liteinoe Proizvodstvo,* v. 5, no. 1, 1954, p. 30-31.)

Previously abstracted from original. See item 8423, v. 3, June 1954.

2578 Ways of Intensifying the Combustion in the Cupola. L. M. Marienbakh and Yu. S. Sukharchuk. *Henry Brutcher, Altadena, Calif., Translation no.* 3395, 14 p. (From *Liteinoe Proizvodstvo,* v. 3, no. 2, 1952, p. 15-17.)

Study of ways and means of increasing the quatity of heat contained in the cupola gases. 13 ref.

2579 Gray Iron Casting With Exothermic Feeding. V. Grice. *Canadian Metals,* v. 12, Nov. 1954, p. 34, 36, 38-40.

Exothermic technique compensates for natural heat losses giving higher quality and greater economy. Diagrams. (To be continued.)

2580* Foundry Practice. IX. The Molten Metal. William H. Salmon and Eric N. Simons. *Edgar Allen News,* v. 33, Nov. 1954, p. 254-255.

After an elementary review of blast furnace practice, describes crucible and hearth melting furnaces. Diagrams. (To be continued.)

2581* Influence of Mineral Black, Pitch, and Sawdust in Green and Stoved Molding Sands. **Influence du noir minéral, du brai et de la farine de bois dans les sables de moulage a vert et étuvés.** (French.) Pierre Nicolas. *Fonderie,* 1954, no. 105, Oct., p. 4163-4174.

Includes graphs, tables.

2582* Solidification and Dimensions for Risers. Verification Test and Application of a Theory. **Solidification et dimensions a donner aux masselottes. Essai de vérification et application d'une théorie.** (French.) Georges Berger and André Belin. *Fonderie,* 1954, no. 105, Oct., p. 4175-4186.

Theory to determine relation between solidification time and dimensions of cast pieces. Experimental data. Photograph, charts, tables. 6 ref.

2583* Introduction of Cast Iron and Steel Turnings Into the Cupola. **Introduction des tournures de fonte et d'acier au cubilot.** (French.) *Fonderie,* 1954, no. 105, Oct., p. 4187-4189.

Enumeration of processes of melting turnings.

2584 A Practical Method for Vacuum Degassing of Nonferrous Metals. Harold F. Bishop, Edward E. Layne, and William S. Pellini. *Foundry,* v. 82, Dec. 1954, p. 78 + 8 pages.

Practical, commercial-type pumps combined with proper risering and gating can produce pressure tight castings. Photographs, micrographs, diagrams.

2585 Eliminating Defects in Die Castings. W. M. Halliday. *Foundry,* v. 82, Dec. 1954, p. 84 + 10 pages.

Causes and remedies of parting-line flash, flow marks, and porosity. Photographs.

2586 Closed-Top Cupolas End Air Contamination. Robert H. Herrmann. *Foundry,* v. 82, Dec. 1954, p. 86-89.

Experience at Ford foundry shows high operating efficiency and almost complete elimination of atmospheric contamination. Drawings, photographs.

2587 Modern Methods Employed in Berliet Foundries of France. Vincent Delport. *Foundry,* v. 82, Dec. 1954, p. 90-93, 242.

Equipment, plant layout, and techniques for production of heavy castings. Photographs.

2588 Some Properties of Phenolic Resin Core Binders. Carl E. Schubert. *Foundry,* v. 82, Dec. 1954, p. 100-101, 248-251.

Tests on cores baked for various times at 350, 400, and 450 F. Graphs.

2589 Centrifugal Casting of Sleeve Bearings. J. B. Mohler. *Foundry,* v. 82, Dec. 1954, p. 102-105.

Types of castings and conditions where the process is economical. Diagrams, photographs. 6 ref.

2590* Problems of Handling Molding Sand. **Probleme der Formsandwirtschaft.** (German.) Karl Roesch. *Giesserei,* v. 41, no. 20, Sept. 30, 1954, p. 514-519.

Effect of heating on molded sand and clay; recovery of old sand by cooling and dedusting. Graphs, diagrams, photograph. 10 ref.

2591* On the Use of Exothermic Gate Inserts for Nodular Cast Iron. **Über die Verwendung von wärmespendenden Trichtereinsätzen beim Gusseisen mit Kugelgraphit.** (German.) Helmut Timmerbeil. *Giesserei,* v. 41, no. 20, Sept. 30, 1954, p. 519-521.

Thermite inserts improve quality and reduce relative size of the gate. Diagrams, micrographs. 1 ref.

2592* On the Flowability of Cast Iron and Its Testing. **Über die Lauffähigkeit von Gusseisen und ihre Prüfung.** (German.) Leo Hütter. *Giesserei,* v. 41, no. 20, Sept. 30, 1954, p. 528-534.

Review of literature; correlation between flow properties, viscosity, and melt composition. Diagrams, graphs. 45 ref.

2593* Combustion Processes in the Shaft Furnace, Especially in the Cupola Furnaces, Until the Oxygen Is Consumed. **Die Verbrennungsvorgänge im Schachtofen, insbesondere im Kupolofen, bis zum Verbrauch des Sauerstoffs.** (German.) Hans Schiffers. *Giesserei,* v. 41, no. 20, Sept. 30, 1954, p. 535-540.

Simultaneous formation of CO and CO_2 by a complex system of reactions; the law of combustion derived from the law of mass effect. Graphs, diagram. 14 ref.

2594* Comparitive Investigations of Special Foundry Cokes. **Vergleichende Untersuchungen von Spezialgiessereikoksen.** (German.) M. Th. Mackowsky. *Giesserei,* v. 41, no. 20, Sept. 30, 1954, p. 540-541.

Study of differences in chemical composition, properties, reactivity, and microstructure. Tables, micrographs. 3 ref.

2595* Cooling and Dedusting Molding Sand. **Kühlen und Entstauben von Formsand.** (German.) W. Gesell. *Giesserei,* v. 41, no. 21, Oct. 14, 1954, p. 578-583.

Discussion of and practical suggestions on the recovery of used molding sand by dry and wet methods of cooling and dust removing. Diagrams, table, graphs. 10 ref.

2596* Defects in Castings and Their Causes. **Gjutgodsfel och deras orsaker. V.** (Swedish.) Holger Pettersson, G. Fernheden, and G. Lindh. *Gjuteriet,* v. 44, no. 9, Sept. 1954, p. 149-156.

Primary causes of scabs, rat-tails, buckles, sandholes, kishes, bums, and parting line seams, and the relations between them. Diagrams, photographs.

2597* Standard Methods of Testing Foundry Sands. **Anvisningar för provning av formmaterial för gjuterier.** (Swedish.) *Gjuteriet,* v. 44, no. 9, Sept. 1954, p. 157-160.

Revision of 1948 Swedish standards include methods for core sands and binders. Diagrams, photographs.

2598 Proper Temperature Instrumentation Reduces Production Costs in Diecasting Process. William Slominske. *Industrial Heating,* v. 21, Oct. 1954, p. 1982 + 4 pages.

Includes photographs.

2599 Frozen Mercury Method Permits Larger Precision Castings. *Industrial Heating,* v. 21, Oct. 1954, p. 2010, 2012.

New medium for extending industrial design possibilities and increases abilities of foundries to handle larger, complex castings with close tolerance requirements. Diagrams, photograph.

2600 Advancements in Induction Melting. G. W. Holz. *Industrial Heating,* v. 21, Nov. 1954, p. 2226 + 5 pages.

Types of induction melting furnaces. Advantages and principles. Typical installations. Photographs, diagrams.

2601 Automation Unit Performs All Operations in Casting of Small Parts. L. F. Miller. *Iron Age,* v. 174, Nov. 4, 1954, p. 128-130.

Integration of 12 operations permits production of up to 300 multiple cavity molds per hr. Diagram, photographs.

Metals—Foundry Practice

2602 Casting Quality, Ease of Mechanization Key Shell Mold Advantages. I-II. W. F. Bye. *Iron Age*, v. 174, Nov. 18, 1954, p. 147-150; Nov. 25, 1954, p. 98-101.

New automatic and semi-automatic equipment. Production techniques. Photographs, tables.

2603* Shrinkage Heads With Internal Gas Pressure for Aluminum-Alloy Castings. **Pribyli s vnutrennim gazovym davleniem dlia otlivok iz aliuminievykh splavov.** (Russian.) L. M. Cherkasov, G. A. Kaplunovskii, I. I. Pavlenko, and A. P. Lubenets. *Liteinoe Proizvodstvo*, 1954, no. 5, Aug., p. 1-3.

Utilization of different pressure-producing charges, and their influence on the quality of Al castings. Table, graph, photograph. 5 ref.

2604* Elimination of Surface Defects of Pressure Castings by Means of Regulating the Heat Balance of the Mold. **Ustranenie defektov poverkhnosti lit'ia pod davleniem putem regylirovaniia teplovogo balansa formy.** (Russian.) V. M. Pliatskii. *Liteinoe Proizvodstvo*, 1954, no. 7, Oct., p. 3-6.

Experimental investigation of causes of defects and methods of prevention. Tables, diagrams.

2605* Oscillographic Method of Measuring the Rate of Metal Travel in Casting Mold. **Ostsillograficheskii metod izmereniia skorosti dvizheniia metalla v liteinoi forme.** (Russian.) T. I. Orlova. *Liteinoe Proizvodstvo*, 1954, no. 7, Oct., p. 25-27.

Basic principles of the method. Techniques of application. Graphs, tables ,diagrams.

2606* Cast Crank Shafts for Vehicle Construction. **Gegossene Kurbelwellen für den Fahrzeugbau.** (German.) Wolfgang Kilian. *Metallurgie und Giessereitechnik*, v. 4, no. 9, Sept. 1954, p. 401-406.

Designs, technique of molding and casting, and results of strength tests. Tables, graph, photographs, diagrams. 4 ref.

2607* Hungarian and Foreign Experiences in the Field of Producing Cylinder Bushings by Centrifugal Casting. **Hazai és külföldi tapasztalotok a pörgetve öntött hengerperselyek gyártásában.** (Hungarian.) Tibor Budinszky and József Gerédi. *Öntöde*, v. 5, no. 6, June 1954, p. 122-128.

Studies using water-cooled Fe molds. Causes of defects. Diagrams, photographs.

2608* Casting and Welding Are Combined in Cockerill-Baldwin Diesel-Electric Locomotives for Otraco. **La construction coulée et la construction soudée se complètent dans les locomotives diesel-électriques Cockerill-Baldwin pour l'Otraco.** (French.) M. Alexandre and P. Laval. *Ossature métallique*, v. 19, no. 10, Oct. 1954, p. 485-490.

Describes construction of the trucks and frame. Photographs, diagrams.

2609* Casting of Bimetallic Bronze Parts. **Sdružené lití bronzů.** (Czech.) Stanislav Lorenc and Milan Julina. *Slévárenství*, v. 2, no. 5, May 1954, p. 130-137.

Details of most frequently used methods for centrifugal castings, bearings, and worm wheels. Diagrams, graph, tables, photographs, micrographs. 3 ref.

2610* Experiences With Cupolas. **Zkušenosti z provozu kuploven.** (Czech.) Josef Plch. *Slévárenství*, v. 2, no. 5, May 1954, p. 144-146.

Design considerations for continuous flow of cast iron and slag. Diagrams.

2611* Precision Controls in Foundry Produce Uniform Quality Meehanite Castings. James Barr. *Western Metals*, v. 12, Nov. 1954, p. 52-54.

Production of high-quality, limited volume castings. Photographs, tables, micrographs.

See also:

3087 (treatment of foundry wastes)

METALS—HEAT TREATMENT

2612 Gas-Carburizing. *Aircraft Production*, v. 16, Nov. 1954, p. 466-468.

Description of equipment and methods utilizing a drip-feed liquid for producing a carburizing-atmosphere. Photographs, diagram, graphs, table.

2613 Fundamentals of Annealing of Cold-Rolled Steel Strip. A. Pomp. *Henry Brutcher, Altadena, Calif., Translation no.* 3087, 14 p. (Abridged from *Stahl und Eisen*, v. 73, no. 3, 1953, p. 133-138.)

Previously abstracted from original. See item 5959, v. 2, July 1953.

2614 Continuous Annealing of Cold Rolled Low Carbon Steel Strip. II. K.-H. Muhr and A. Pomp. *Henry Brutcher, Altadena, Calif., Translation no.* 3360, 16 p. (Abridged from *Stahl und Eisen*, v. 73, no. 14, 1953, p. 891-894.)

Results of continuous annealing experiments on seven grades of steel strip studied at different speeds of travel through the furnace and different rates of cooling in two temperature ranges to explore the effect of the annealing time on the tensile and deep drawing properties, and microstructure. Photographs, graphs. 23 ref.

2615 Annealing of Malleable Iron Checked by the Magnetic Properties. K. P. Zhadnov. *Henry Brutcher, Altadena, Calif., Translation no.* 3383, 4 p. (From *Liteinoe Proizvodstvo*, v. 5, no. 1, 1954, p. 29-30.)

Description and operation of electromagnetic instrument checking the results of annealing of real-axle gear boxes and gearbox covers. Micrographs, table, graphs.

2616* Handling and Treating Hard Metal Tools for Percussion and Rotary Drills and Drill Rods. **Handhabung und Behandlung von Hartmetallwerkzeugen für schlagendes und drehendes Bohren und von Bohrstangen.** (German.) Otto Müller. *Glückauf*, v. 90, nos. 37-38, Sept. 11, 1954, p. 1074-1085.

Uses of different types of drills; methods of attaching drills to drill rods; rod fractures. Heat treatment of hollow drills; forging of drill rods. Tables, diagrams, photographs. 30 ref.

2617 Automatic Gas Carburizing of Automotive Gears. R. J. Peters. *Industrial Heating*, v. 21, Oct. 1954, p. 1938-1940 + 5 pages.

A means for increasing demands for automotive transmissions of relatively constant size but with increasingly greater strength and torque-absorption ability. Photographs, graph, table, diagram. 3 ref.

2618 How to Reduce Heat Treating Costs When Using Ammonia. Paul E. Peacock, Jr. *Industrial Heating*, v. 21, Oct. 1954, p. 1952-1954, 1956, 1958.

Economics of an installation for the bright annealing of stainless steel wire. Photographs. (To be continued.)

2619 Fundamentals of Gas Carburizing. Walter Holcroft. *Industrial Heating*, v. 21, Nov. 1954, p. 2196 + 5 pages.

Equipment and methods. Determination of case depth. Diagram, graphs, table.

2620 Theory of Furnace Gas Atmospheres. Allen G. Hotchkiss. *Industrial Heating*, v. 21, Nov. 1954, p. 2212 + 7 pages.

Gases, equilibrium data; carburizing reactions. Photographs, diagrams, graphs.

2621 How to Reduce Heat Treating Costs When Using Ammonia. II. Paul E. Peacock, Jr. *Industrial Heating*, v. 21, Nov. 1954, p. 2234, 2236, 2238.

Operating costs in use of ammonia for H protection of bright finish of fine stainless steel wire during annealing. Graph, tables.

2622* Carburizing Controls at Caterpillar. L. A. Beaudry. *Instrumentation*, v. 7, no. 5, 1954, p. 4-6.

Carburizing cycle and control equipment for pit-type furnaces. Photographs, diagram.

2623 Proper Treatments Preserve Properties of Types 321 and 347 Stainless. Hiram Brown. *Iron Age*, v. 174, Nov. 25, 1954, p. 93-95.

Heat treatments and welding techniques required to maintain corrosion resistance. Micrograph, photographs.

2624 Measurement of Case Depth After Carburization. J. Taylor. *Iron and Steel Institute, Journal*, v. 178, Nov. 1954, p. 291-296.

Empirically derived curves are more reliable than those calculated from mean value of diffusivity coefficient. Tables, graphs. 13 ref.

2625 A New Wear-Resisting Treatment. J. Lomas. *Machinery Lloyd (Overseas Ed.)*, v. 26, Nov. 6, 1954, p. 83-85.

Sulfurizing of steel and cast iron in a salt bath produces a soft, porous, but very wear resistant surface.

2626 Special Atmosphere Graph for Heat Treatment Prepared From Natural Gas Analyses. *Materials & Methods*, v. 40, Nov. 1954, p. 135.

Chart for computing heat treating atmospheres.

2627* Electric Furnaces Having Submerged Electrodes. **Fours électriques à électrodes plongeantes.** (French.) *Métallurgie et la construction mécanique*, v. 86, no. 9, Sept. 1954, p. 671, 673.

Discusses operating characteristics and advantages of salt-bath furnaces. Photograph, diagram.

2628 Theory of Gas Atmospheres. A. G. Hotchkiss. *Metal Progress*, v. 66, Nov. 1954, p. 81-86.

Brief consideration of the fundamental scientific principles governing the reactions between hot metal and hot gases. Table, photographs, graphs.

2629 Exothermic Atmospheres—Their Generation and Application. W. H. Boyd. *Metal Progress*, v. 66, Nov. 1954, p. 86-89.

Includes graph, diagram, photograph.

2630 Endothermic Atmosphere. Ralph J. Perrine. *Metal Progress*, v. 66, Nov. 1954, p. 89-93.

Temperature variation within the catalytic mass and other factors affecting the composition of the prepared gas and its stability after entering the heat treatment furnace. Diagram, tables, graphs.

2631 Dry Nitrogen as a Base for Prepared Atmospheres. Donald Beggs. *Metal Progress*, v. 66, Nov. 1954, p. 94-98.

Methods of manufacture and commercial equipment. Diagrams, photographs.

2632 Elements of Gas Carburizing. Walter H. Holcroft. *Metal Progress*, v. 66, Nov. 1954, p. 106-109.

Equipment and techniques. Graphs.

2633 Induction Heat Treating. Harry B. Osborn, Jr. *Metal Progress*, v. 66, Nov. 1954, p. 125-129.

Typical applications and advantages over other hardening methods. Photographs.

2634* Physics of Flame Hardening. **Werkstoffmechanik der Flammhärtung.** (German.) W. Marfels. *Schweissen und Schneiden*, v. 6, no. 10, Oct. 1954, p. 411-416.

Advantages; transformations, mechanical properties of surface and core; distortion. Graphs, micrographs, diagrams. 8 ref.

2635* Isothermal Hardening of Alloy Tool Steels. **Izotermicheskaia zakalka legirovannoi instrumental'noi stali.** (Russian.) Iu. A. Geller. *Stanki i Instrument*, v. 25, no. 10, Oct. 1954, p. 16-20.

Effects of temperature and time of holding on mechanical and physical properties. Graphs. 10 ref.

2636 Controlled Atmosphere Heat Treating. I-II. Henry M. Heyn. *Steel*, v. 135, Nov. 22, 1954, p. 96-98; Nov. 29, 1954, p. 72-74.

Preparation of atmospheres, furnaces, and control of compositions. Photograph, graphs, table.

2637* Heat Treatment of Steel 18KhGT, With Application of a Solid Carbonizer. **O termoobrabotke stali 18 KhGT s primeneniem tverdogo karbiurezatora.** (Russian.) K. A. Kashchenko. *Vestnik Mashinostroeniia*, v. 34, no. 9, Sept. 1954, p. 62-65.

Describes investigation of above for the purpose of replacing steel 12KhN2 in the manufacture of equipment for the autotractor industry. Tables, graphs.

2638* The Response to Heat Treatment of 18/8 Wires Given Various Percent Gold Reductions. Samuel Storchheim. *Wire and Wire Products*, v. 29, Nov. 1954, p. 1327-1330.

Possibilities of producing a highly magnetic state by repeated cold work and annealing at 1225 F. Tables, graph. 2 ref.

See also:
2648 (annealing of brass)

METALS—MECHANICAL AND PHYSICAL PROPERTIES

2639* Influence of Hardening and Recrystallization on the Elastic Constants of Aluminum. **Influenza dell'incrudimento e della ricristallizzazione sulle costanti elastiche dell'alluminio.** (Italian.) F. Gatto. *Alluminio*, v. 23, no. 5, Oct. 1954, p. 503-513.

Electroacoustic tests permit study of structural changes for various hardening treatments. Graphs, diagrams, photograph, tables. 13 ref.

2640 Coefficients of Thermal Expansion of Solids at Low Temperatures. I. The Thermal Expansion of Copper From 15 to 300°K. Thor Rubin, Howard W. Altman, and Herrick L. Johnston. *American Chemical Society, Journal*, v. 76, Nov. 5, 1954, p. 5289-5293.

Apparatus for measuring thermal expansion of solids from 15 to 300 K. Experimental data for Cu. Diagrams, tables, graphs. 15 ref.

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Fatigue tests on tubular specimens of steels and Al alloys. Photographs, graphs, diagrams.

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3333, 5 p. (From *Doklady Akademii Nauk SSSR*, v. 94, no. 4, 1954, p. 663-665.)

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Measurements of lattice parameters. Methods of low temperature X-ray photography. Diagram, graph, table. 19 ref.

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Sources of weakness; type of failure. Recent research on strain measurement and design. Photographs, graphs.

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Magnetic susceptibility of metallic Pu was measured up to 350 C. Indications of structure transitions were observed at 119, 205, and about 300 C. Tables, graphs.

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Results of work on Ni-Be and Ni-Mg alloys. Tables. 3 ref.

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Study of the ferromagnetism of Fe-Ni alloys after one or several annealings in H above the Curie temperature. Graphs, table. 6 ref.

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Variation of magnetization as a function of field strength and temperature. Graphs.

2656* Influence of Alloying Additions on the Temperature Dependence of the Shear Modulus of Iron. **Vliianie legiruiushchikh dobavok na temperaturnuiu zavisimost' modulia sdviga zheleza.** (Russian.) N. S. Rysina and B. N. Finkel'shtein. *Doklady Akademii Nauk SSSR*, v. 98, no. 2, Sept. 11, 1954, p. 215-217.

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Results of tests made between 1947 and 1950, using the frozen stress technique, based on the photoelastic investigation of Teverovsky in 1940. Graphs, stress patterns, photograph, diagram, table.

2658 Stresses in Short Beams. I. Experimental Analysis. J. S. Caswell. *Engineering*, v. 178, Nov. 12, 1954, p. 625-628.

Compares theoretical estimate of the max. shear stresses with an experimental estimate obtained by photoelastic analysis. Graphs, fringe patterns, diagram. 2 ref.

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Corrosion resistance and high-temperature mechanical strength of pearlitic, ferritic, and austenitic grades. Graphs, table.

2660* Mechanical and Physical Properties of Titanium Stabilized Austenitic Chromium-Nickel Steel Castings. **Mechanické a fysikální vlastnosti odlitků z austenitické chromniklové oceli stabilisované titanem.** (Czech.) Zdeněk Eminger, Antonín Fiala, and Jaroslav Šlajs. *Hutnické Listy*, v. 9, no. 9, 1954, p. 514-523.

Effects of Ti on intercrystalline corrosion, mechanical properties, and magnetization. Diagrams, graphs, tables, photograph. 11 ref.

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Tests show that slip and grain-boundary displacement occur concurrently. Magnitude of ratio depends on test conditions. Tables, graphs, micrographs, reflection patterns. 32 ref.

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Influence of precipitation on fatigue strength. Diagram, graphs, photograph, micrographs, table. 1 ref.

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Twins in single crystals formed by bending can be removed by unbending or by annealing. Micrographs. 19 ref.

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Observations during room temperature tensile tests at various testing rates and rest periods. Graphs. 6 ref.

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Describes a new method for the nondestructive measurement of the mechanical hardness of ferromagnetic components, based on the relationship between a "coefficient of magnetic hardness" and the variables in the upper portion of the magnetization curve. Graphs, tables, diagrams. 8 ref.

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Mechanical properties at room temperature and 700 to 850 C of a Co-Ni-Cr-Fe alloy. Tables, graphs, photograph. 5 ref.

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Problems of fluctuating loads induced by a jet, which result in possible fatigue failure of aircraft structural components, aided by the stress spectrum and "equivalent fatigue stress". Graphs, diagrams. 20 ref.

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Schnadt-type impact specimens of SAE 1019 steel were irradiated with 18.6 m.e.v. deuterons. Table, graphs, diagram. 26 ref.

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Effects of weak-end support and axial loading in addition to vertical loading on an isotropic plastic-rigid material. Diagrams, tables, graphs. 18 ref.

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Effects of cooling rate below 1200 F after hot rolling on brittleness of 1020 steel plate. Table, graph. 2 ref.

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2687 A Calorimetric Investigation of Heats of Formation and Precipitation in Some Cu-Sn Alloys. J. B. Cohen, J. S. Ll. Leach, and M. B. Bever. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Nov. 1954, p. 1257-1258.

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2688 Temper Embrittlement of 5140 Steel. S. H. Bush and C. A. Siebert. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Nov. 1954, p. 1269-1271.

Isothermal studies at various temperatures for times up to 3000 hr. Hardness, impact strength, and structures were determined. Table, micrographs. 7 ref.

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Data for N and Al alloys. Increasing grain size decreases strength and hardness and increases impact resistance. Precipitation was found in high N alloys. Tables, micrographs, graphs. 11 ref.

2690* Magnetic Properties of Some Rare Earth Metals and Oxides. **Propriétés magnétiques de quelques métaux et**

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2691* Fatigue Studies of Aluminum Alloys and of Welded Seams. **Váltakozó igénybevételknek kitett aluminiumötvözetek és azok negesztett kötéseinek kifáradási határa.** (Hungarian.) István Varga. *Kohászati Lapok,* v. 9, no. 10, Oct. 10, 1954, p. 474-480.

Tests on Al-Cu-Mg, Al-Mg-Si, Al-3% Mg, and Al-5% Mg alloys in air, river water, motor oil, and ethyl benzene. Diagrams, graphs, photographs.

2692* Influence of Boron on the Properties of Cast Austenitic Chromium-Nickel Steel of the Kh15N25 Type (15 Cr, 25 Ni). **Vliianie bora na svoistva litoi austenitnoi khromonikelevoi stali tipa Kh15N25.** (Russian.) N. S. Kreshchanovskii, V. I. Prosvirin, and E. S. Ginzburg. *Liteinoe Proizvodstvo,* 1954, no. 5, Aug., p. 16-19.

Influence of B additions (0.02 to 1.0%) on crystalline structure, amount of carbides, rate of aging, impact strength, and hardness of cast and forged Kh15N25 steel. Tables, graphs, micrographs, photographs. 7 ref.

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Obtaining accurate mechanical property data provides a simple method for statistical determination of actual yield-point variation. Tables, graph. 3 ref.

2695 Two New Aluminum Extrusion Alloys. *Materials & Methods,* v. 40, Nov. 1954, p. 90-91.

Mechanical properties and design strength comparisons. Tables, photograph.

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Review of work on ductility of Cr. Graph. 8 ref.

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Calculations for 27 metals in cases where experimental data is lacking. Indirect experimental data substantiate estimated values. Tables, graphs. 26 ref.

2698 The Cause of Temper Brittleness in Steel. A. M. Sage. *Metal Treatment and Drop Forging,* v. 21, Oct. 1954, p. 463-468.

Assessment of present knowledge. Characteristics of elements causing or reducing susceptibility. Graphs, micrograph, tables. 16 ref.

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Electrical effects of dislocations in Ge. Graphs.

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Measurement of electrical conductivity, Hall effect, and optical absorption. Graphs, tables. 19 ref.

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Studies of a 97% Cu-3% Ag alloy. Diagrams, graphs, tables. 16 ref.

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Analysis and evaluation of phenomenon in non-uniformly and uniformly stressed members. Graphs, diagrams, tables. 8 ref.

2704 Scoring Characteristics of Bearing Metals. A. E. Roach. *Product Engineering,* v. 25, Nov. 1954, p. 171-175.

Results of survey covering relative score resistance of 38 bearing materials when run against steel; ratings to simplify choice of metal for given bearing use. Photographs, diagram, table.

2705* Creep Properties of "Oneral", a Cast Refractory Alloy. **Propriétés de fluage de l'oneral alliage réfractaire de fonderie.** (French.) J. Poulignier and H. Bibring. *Recherche Aéronautique,* 1954, no. 41, Sept.-Oct., p. 47-51.

Characteristics of alloy which has Co-Cr base, containing Mo, Ni, Ti, Zr, and C. Graphs, photographs.

2706* Young's Modulus of Aluminium and Its Alloys as a Function of Temperature. **Le module d'Young de l'aluminium et de ses alliages en fonction de la température.** (French.) E. G. Stanford. *Revue de métallurgie,* v. 51, no. 10, Oct. 1954, p. 674-678; disc., p. 678.

Variation of damping capacity with temperature and its use in study of recrystallization. Diagrams, graphs.

2707* Plasticity of Hexagonal Metals and Its Variation With Temperature. **La plasticité des métaux du système hexagonal et ses variations avec la température.** (French.) S. F. Pugh. *Revue de métallurgie,* v. 51, no. 10, Oct. 1954, p. 683-692.

Plasticity is related to elastic constants. Changes in mode of deformation with temperature are related to relaxation processes. Graph, table, diagrams. 37 ref.

2708 The Slip Modes of Titanium and the Effect of Purity on Their Occurrence During Tensile Deformation of Single Crystals. A. T. Churchman. *Royal Society, Proceedings,* v. 226, ser. A, Nov. 9, 1954, p. 216-226.

Identification of slip modes. Tables, photographs, diagrams. 16 ref.

2709* Correlations Between Fracture Appearance and the Steep Slope of the Notched Bar Toughness-Temperature Curve of Soft Steels. **Zusammenhang zwischen Bruchaussehen und Steilabfall der Kerbschlagzähigkeits-Temperatur-Kurve bei weichen Stählen.** (German.) Heinz Kornfeld. *Stahl und Eisen,* v. 74, no. 23, Nov. 4, 1954, p. 1526-1536.

Statistical analysis of data for open-hearth fine-grain and rimming steels, and Armco iron from −60 to 40C. Tables, graphs, photographs. 5 ref.

2710 Cast Ferrous Metals. II. What Physicals Can You Expect? III. What Are Their Performance Limits? T. E. Eagan. *Steel,* v. 135, Nov. 22, 1954, p. 112-114; Nov. 29, 1954, p. 80-82.

Factors influencing mechanical properties of Fe and steel castings.

2711* Relationship Between Wear Resistance of Metals Under Friction Against an Abrasive Surface and Their Hardness. **O zavisimosti mezhdu iznosostoikost'iu metallov pri trenii ob abrazivnuiu poverkhnost' i ikh tverdost'iu.** (Russian.) M. M. Kruschov and M. A. Babichev. *Vestnik Mashinostroeniia,* v. 34, no. 9, Sept. 1954, p. 3-9.

Describes method of investigation and discusses diagrams of hardness (Vickers or microhardness) versus wear resistance for

pure metals, various carbon steels, and cold-hardened metals. Diagrams, table. 4 ref.

2712* Comparison of Conditions of Fatigue Strength. **Sravnenie uslovii ustalostnoi prochnosti.** (Russian.) I. A. Birger. *Vestnik Mashinostroeniia,* v. 34, no. 9, Sept. 1954, p. 14-20.

Treats mathematically the fatigue-strength patterns of plastic metals for the important practical case where only normal and tangential stresses are acting. Graphs. 7 ref.

2713* Influence of Mechanical Treatment on Wear Resistance of Steel Parts of Machinery. **Vliianie mekhanicheskoi obrabotki na iznosoustoichivost' stal'nykh detalei mashin.** (Russian.) A. A. Matalin. *Vestnik Mashinostroeniia,* v. 34, no. 10, Oct. 1954, p. 57-62.

Influence of residual stresses and surface finish on wear resistance. Diagrams. 5 ref.

2714* Quality of Surface and Fatigue Strength. **Kachestvo poverkhnosti i ustalostnaia prochnost'.** (Russian.) D. D. Papshev. *Vestnik Mashinostroeniia,* v. 34, no. 10, Oct. 1954, p. 64-68.

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2715 Contributions to the Data on Theoretical Metallurgy. XII. Heats and Free Energies of Formation of Inorganic Oxides. James P. Coughlin. *U. S. Bureau of Mines Bulletin* 542, 1954, 80 p. (TN21 Un3b)

Data for evaluating heat balances in metallurgical processes, appraising improvements in extractive methods, and as a guide for developing better production methods. Tables. 169 ref.

2716 Tests of Extruded Magnesium Cargo Flooring for Aircraft. J. A. Liska. *U. S. Department of Agriculture, Forest Products Laboratory, Report No.* 1550-I, Oct. 1954, 11 p. + 38 plates.

Load tests on floor panels of various designs. Tables, diagrams, photographs, graphs.

2717 Shearing-Stress Measurements by Use of a Heated Element. H. W. Liepmann and G. T. Skinner. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3268, Nov. 1954, 27 p. (TL570 Un3t)

Use of small elements embedded in the surface of a solid to obtain local skin-friction coefficients. Graphs, diagrams. 9 ref.

2718 Investigation of Static Strength and Creep Behavior of an Aluminum-Alloy Multiweb Box Beam at Elevated Temperatures. Eldon E. Mathauser. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3310, Nov. 1954, 21 p. (TL570 Un3t)

Tests on beams made of 24S-T3. Lifetime can be satisfactorily predicted from stress-rupture data. Tables, diagrams, photographs, graphs. 14 ref.

2719 Crack Propagation. Frederick Forscher. *Welding Journal,* v. 33, Nov. 1954, p. 579S-584S.

A modified Griffith's crack mechanism is used to analyze reported data. A material property called "fracture toughness" is of major importance. Diagrams, photographs, graph. 16 ref.

2720* A New Flow Analogy of Torsion. **Ein neues Strömungsgleichnis der Torsion.** (German.) E. Pestel. *Zeitschrift für angewandte Mathematik und Mechanik,* v. 34, nos. 8-9, Aug.-Sept. 1954, p. 322-323.

Mathematical relationship between the behavior of a viscous liquid and the torsional behavior of a primatic bar. Diagram.

2721* The Jordan Hysteresis in Ferromagnetic Sheet Metals. **Die Jordan-Nachwirkung in ferromagnetischen Blechen.** (German.) Richard Feldtkeller and Günther Sorger. *Zeitschrift für angewandte Physik,* v. 6, no. 9, Sept. 1954, p. 390-396.

Measurement of complex permeability as a function of frequency, field strength, and temperature; explanation of the Jordan hysteresis by Nèels theory on irreversible magnetic viscosity and by the Barkhausen effects. Table, graphs. 20 ref.

2722* Solubility of Several Transition Metals in Mercury. **Zur Löslichkeit einiger Übergangsmetalle in Quecksilber.** (German.) J. F. de Wet and R. A. W. Haul. *Zeitschrift für anorganische und allgemeine Chemie,* v. 277, nos. 1-2, Sept. 1954, p. 96-112.

Preparation of the amalgams; spectrochemical, colorimetric, and electronmicroscopic studies; discussion of the behavior of Mn and Ni. Tables, diagram, graph, micrograph. 30 ref.

2723* Property Changes During the Age Hardening of an Aluminum-Silicon Alloy. **Eigenschaftsänderungen während der Aushärtung einer Aluminium-Silizium-Legierung.** (German.) Werner Köster and Willy Knorr. *Zeitschrift für Metallkunde,* v. 45, no. 10, Oct. 1954, p. 616-617.

Effect of annealing temperature and time on electrical, torsion, and hardness properties. Graphs. 4 ref.

2724* Creep Tests on Aluminum Monocrystals at Successively Increased Loads. **Kriechversuche an Aluminium-Einkristallen bei stufenweise erhöhter Belastung.** (German.) Martin Bauser and Ulrich Dehlinger. *Zeitschrift für Metallkunde,* v. 45, no. 10, Oct. 1954, p. 618-621.

Experimental equipment and procedure for measuring very small elongations. Diagram, graphs, table. 5 ref.

2725* The Hall Effect and the Variation in the Resistance of Lead, Copper, and Magnesium in a Magnetic Field. **Effekt kholla i izmenenie soprotivleniia svintsa, medi i magniia v magnitnom pole.** (Russian.) E. S. Borovik. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki,* v. 27, no. 3 (9), Sept. 1954, p. 355-368.

Comparison of experimental data and theoretical calculations over the range 2 to 300 C. Graphs, tables. 31 ref.

Books and Miscellaneous Publications

2726 Fatigue. Thomas J. Dolan, B. J. Lazan, and Oscar J. Horger. 121 p. 1954. American Society for Metals, Cleveland. (TA460 Am35fe)

Basic concepts of fatigue damage, fatigue failure under resonant vibration conditions, and fatigue characteristics of large sections.

2727 Fatigue Tests on Rolled Alloy Steels Made in Electric and Open-Hearth Furnaces. P. H. Frith. Special Report No. 50, British Iron and Steel Research Association. 130 p. + 22 plates. 1954. The Iron and Steel Institute, London. (TN601 I6s)

Ratios of reversed bending and reversed torsional fatigue strengths for steels heat treated to various strengths. Effects of production method and inclusions.

2728 Strength and Resistance of Metals. John M. Lessells. 450 p. 1954. John Wiley and Sons, New York. (TA405 L56s)

Takes into account various stress conditions including static tension and compression, creep, alternating loads, impact, and high surface stresses as in wear.

2729 Behavior of Metals Under Impulsive Loads. John S. Rinehart and John Pearson. 256 p. 1954. American Society for Metals, Cleveland. (TA460 R47b)

Concept of impulsive loading, properties of materials, methods of observation, equipment ,deformation, and structural changes.

2730 Ferromagnetic Domains. K. H. Stewart. Cambridge Monographs on Physics. 176 p. 1954. Cambridge University Press, London. (QC761 St49f)

Considers the various factors affecting the behavior of individual domains; the way in which domains are combined in actual ferromagnetic substances; and the dependence of observed behavior of ferromagnetic materials on laws governing individual domains.

See also:

2069 (embrittlement during galvanizing)
2150 (electrical properties of Fe and W)
2190 (thermoelectron emission of Cu)
2463 (large elastic deformations)
2481 (elasticity theory)
2615 (magnetic properties of malleable iron)
2771 (deformation twinning)
3018 (Smithsonian physical tables)
3144 (stresses in welded structures)
3158 (strength of brazed joints)
3159 (buckling of welded structures)

METALS—MECHANICAL WORKING

2731* Calculation of Spreading and of Forward Slip in Rolling. **Berechnung der Breitung und Voreilung beim Walzen.** (German.) A. Geleji. *Acta Technica Academiae Scientiarum Hungaricae*, v. 9, nos. 3-4, 1954, p. 443-458.

Effect of variations in dimensions of the rolled piece. Graphs, diagrams. 9 ref.

2732* Fundamentals of Extrusion Theory. **Fondamenti della teoria dell'estrusione.** (Italian.) F. Gatto. *Alluminio*, v. 23, no. 5, Oct. 1954, p. 533-545.

Calculations of pressure considering geometry of container, type of alloy, temperature, and extrusion rate. Results are compared with experimental data. Photographs, diagrams, graphs, tables. 6 ref.

2733 Russian Report. Ceramic-Tipped Tools Will Cut Steel. *American Machinist*, v. 98, Nov. 22, 1954, p. 113-115.

Review and evaluation of data in Russian literature. Diagrams, tables. 8 ref.

2734* Steel and Copper Rod Rolling: A Comparison of Techniques. J. Guthrie and E. Fischl. *Australasian Engineer*, 1954, Sept., p. 52-60; disc., p. 60-63.

Contrasts the two types of rolling mills. Construction features; economic factors; pass designs. Diagrams, photographs, table. 3 ref.

2735* Electronic Servo Positioning. Walton Rainey. *Automation*, v. 1, Nov. 1954, p. 61-64.

Automatic positioning of workpiece in machine tools. Diagrams, photographs.

2736 A Theoretical Investigation of the Temperature Distribution in the Metal Cutting Process. A. C. Rapier. *British Journal of Applied Physics*, v. 5, Nov. 1954, p. 400-405.

Relaxation and analytical methods of solution were developed and applied to the work material, the chip and the tool. Diagrams, graphs. 8 ref.

2737 Steel Sections for Welding. R. G. Braithwaite. *British Welding Journal*, v. 1, Nov. 1954, p. 481-486.

Production of various shapes and welding techniques for their use. Diagrams. 2 ref.

2738* Contribution to the Study of the Heating Cycle of Special Steels in Rolling-Mill Pusher-Type Furnaces. **Contribution à l'étude du cycle de chauffage des aciers spéciaux dans les fours poussants de laminoirs.** (French.) M. Boutin. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques*, v. 11, no. 10, 1954, p. 1931-1944.

Selection of furnace: heating curves, quality and regulation of heat, furnace atmospheres, heat consumption, etc. Tables, graphs. 9 ref.

2739* The Grinding of Steel. XXI. Finishing by Abrasive Belt. *Edgar Allen News*, v. 33, Nov. 1954, p. 256-257.

Belt grinding machines; abrasives; operating procedures. (To be continued.)

2740* Lowering the Costs of Wear in Rolls. **Obnizenie kosztów zużycia walców.** (Polish.) Józef Górecki. *Hutnik*, v. 21, no. 9, 1954, p. 285-291.

Advantageous design and arrangement of various types of roll passes. Comparative wear figures. Diagrams, table.

2741 An Ultrasonic Machine Tool. Neil Clark, Jr. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Ultrasonics Engineering*, PGUE-2, Nov. 1954, p. 10-18. (TK1 In6.6u)

Description of theory, design, operation, action, and application. Photographs, diagrams, circuits.

2742 Ultrasonic Machining of Tungsten Carbide. Dieter Goetze. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Ultrasonics Engineering*, PGUE-2, Nov. 1954, p. 19-22. (TK1 In6.6u)

Factors affecting operation with results. Graphs.

2743 Resistance Heating, Pressure Combined to Rapidly Form Aluminum Extrusion. W. D. Latiano. *Iron Age*, v. 174, Nov. 4, 1954, p. 124-125.

Converted resistance welder provides rapid heating, close control, low heat losses, and prevention of overaging. Photographs.

2744 Force, Temperature Measurements Rapid Guide to Tool Life Evaluation. E. A. Loria and D. R. Walker. *Iron Age*, v. 174, Nov. 18, 1954, p. 156-158.

Results are more useful and reliable than wear test data. Tables, graphs, photograph.

2745 A Mechanical Extrusion Press for Producing Tubes and Bars. Astor L. Thurman. *Iron and Steel Engineer*, v. 31, Nov. 1954, p. 64-73; disc., p. 73-74.

Equipment, processes, and materials processed. Tables, diagrams, photographs, graphs.

2746 Mechanical Features of Modern Bar and Rod Mills. E. C. Peterson. *Iron and Steel Engineer*, v. 31, Nov. 1954, p. 103-108; disc., p. 108-111.

Refinements in engineering and auxiliaries produce better bar and rod at increasing speeds. Photographs, diagrams.

2747 An Investigation of Reheating Furnace Design and Performance. F. A. Gray and S. H. Brooks. *Iron and Steel Institute, Journal*, v. 178, Nov. 1954, p. 223-266.

Interrelationships of variables affecting billet heating furnaces. Diagrams, photograph, graphs, tables. 8 ref.

2748 The Operation of Soaking Pits. J. Dodd. *Iron and Steel Institute, Journal*, v. 178, Nov. 1954, p. 297-300 + 1 plate.

Fuel savings by proper control and organization. Photographs.

2749 The Mechanics of Machining: A New Approach. R. Hill. *Journal of the Mechanics and Physics of Solids*, v. 3, Oct. 1954, p. 47-53.

Method uses a theorem on maximum intensity of singularities in a material that yields when the shear stress attains a critical value. Diagram, tables, graphs. 7 ref.

2750 Dodge Finishes Pistons by Turning. B. W. Bogan. *Machinery*, v. 61, Nov. 1954, p. 170-177.

Need for cam grinding operations is eliminated; quality is improved. Photographs, diagrams.

2751* Cutting Forces: Their Effects on Milling Operations and Milling Cutter Selection. Horace A. Frommelt. *Machine and Tool Blue Book*, v. 49, Nov. 1954, p. 186 + 11 pages.

Relationships between the force and rate at which it is applied in slab, face and straddle, step and duplex, and conventional and climb mills. Diagrams.

2752* Hot Machining. **L'usinage à chaud.** (French.) H. Laplanche. *Métallurgie et la construction mécanique*, v. 86, no. 9, Sept. 1954, p. 659, 661-662.

Discusses principles and use for very hard alloys. Test results. Graphs, tables.

2753* Cold Shapes—Preparation and Interest. **Les profils à froid; leur élaboration, leur intérêt.** (French.) A. Ogus. *Métallurgie et la construction mécanique*, v. 86, no. 9, Sept. 1954, p. 643, 645-647, 649.

Production by wire-drawing dies and bending presses; comparison between cold shapes and hot-rolled products. Diagrams, photographs.

2754 Drop Forging in the Railway Industry. I. The Forging Practice of British Railways (Midland Region). *Metal Treatment and Drop Forging*, v. 21, Oct. 1954, p. 469-476.

Equipment and practices for producing a wide range of types and sizes of forgings from new material and from scrap. Photographs, diagrams, table. (To be continued.)

2755* Theory Relative to the Influence of Elements and Hexagonal Compounds in Polycrystalline Groups. **Théorie relative à l'influence des éléments et composés hexagonaux dans les ensembles polycristallins.** (French.) A. Paudrat.

Métaux, Corrosion-Industries, v. 29, no. 349, Sept. 1954, p. 315-334.

Theoretical study of phenomena of dry lubrication, wear resistance, and cutting rate during machining of steel. Diagrams, graphs, table. (To be continued.)

2756* **Versatile Pint-Sized Rolling Mills.** A. I. Nussbaum. *Modern Metals*, v. 10, Nov. 1954, p. 74, 76, 78.

Research mill can be rapidly converted from two-high to four-high configuration. Photographs, tables.

2757 Designing for Production—Retaining. II. W. M. Halliday. *Product Engineering*, v. 25, Nov. 1954, p. 182-183.

Five basic ideas for clamping, holding, and clinching parts during machining. Diagrams.

2758 Design Possibilities for Automatic Spinning. F. L. Banta. *Product Engineering*, v. 25, Nov. 1954, p. 188-192.

Advantages, limitations, and other criteria for determining applicability; comparison of piece costs with stamping operation. Photographs, diagrams, table, graph.

2759 Troubles With Cold Extrusion May Be Traced to Lubrication. J. F. Leland and J. W. Helms. *SAE Journal*, v. 62, Nov. 1954, p. 43-45.

Step-by-step procedure for one recommended coating and lubricating cycle. Photograph.

2760 Problems Encountered in the Design of Press Tools. J. A. Grainger. *Sheet Metal Industries*, v. 31, no. 331, Nov. 1954, p. 897-905, 928.

Principles for blanking, piercing, and drawing dies. Diagrams, photographs. (To be continued.)

2761 Recent B.I.S.R.A. Work on the Elimination of Stretcher Strains in Mild-Steel Pressings. B. B. Hundy. *Sheet Metal Industries*, v. 31, no. 331, Nov. 1954, p. 909-920.

Factors influencing temper rolling and levelling processes. Photographs, graphs, diagrams. 28 ref.

2762 The Rolling of Metals and Alloys. III. E. C. Larke. *Sheet Metal Industries*, v. 31, no. 331, Nov. 1954, p. 947-951, 958.

Causes and control of thickness variations. Photograph, graphs. 5 ref. (To be continued.)

2763 Billet Separation by the Shear-Fracture Method. W. C. Tucker. *Steel Processing*, v. 40, Nov. 1954, p. 695-698, 731.

Theory and techniques for cutting steel billets to desired lengths. Photographs, diagrams.

2764* Induction Heating of Forging Billets. **Induktives Erwärmen von Schmiedeknüppeln.** (German.) *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 29, Oct. 11, 1954, p. 990-991.

Power consumption and heating times as functions of diameter of billet and frequency; faster heating in a longitudinal than in a transverse field. Graphs.

2765* Production of Sheet Metal. **Das Herstellen von Blech.** (German.) Erich Howahr. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 30, Oct. 21, 1954, p. 997-1004.

Review of history and description of modern sheet-metal rolling mills. Photographs, diagrams.

2766* Investigation of Temperature in the Case of Super-High Cutting Rates. **Issledovanie temperatury pri obrabotke na sverkhvysokikh skorostiakh resaniia.** (Russian.) E. D. Salomonovich. *Vestnik Mashinostroeniia*, v. 34, no. 9, Sept. 1954, p. 45-46.

Experimentally determines average temperatures at point of contact between cutter made of hard alloy and material being machined. Diagrams. 4 ref.

2767* Change of Shape of Prismatic Metallic Specimens During Hammer Upsetting. **Formoizmenenie metalla prizmaticheskikh obraztsov pri osadke pod ploskimi boikami.** (Russian.) A. I. Skonechnyi. *Vestnik Mashinostroeniia*, v. 34, no. 9, Sept. 1954, p. 57-62.

On the basis of experimental data and mathematical analysis, formulas are derived for calculating maximum and minimum deformation during forging. Tables, diagrams. 4 ref.

2768* Determination of Stability Relationships During High-Speed Cutting According to the Hardness of Hard Alloys and Steels in the Hot State. **Opredelenie stoikostnykh zavisimostei pri skorostnom rezanii po tverdosti tverdykh splavov i stalei v gorichem sostoianii.** (Russian.) A. I. Betaneli. *Vestnik Mashinostroeniia*, v. 34, no. 10, Oct. 1954, p. 62-64.

Describes method for determining stability according to the difference in the hardness of the cutting and cut materials. Nomogram. 4 ref.

2769 Plate Edge Preparation. *Welding and Metal Fabrication*, v. 22, Nov. 1954, p. 402-407.

Comments from various fabricators on relative merits of gas cutting and mechanical shearing. Photographs.

2770* **Quality Control in the Wire Industry.** Axel U. Sternlof. *Wire and Wire Products*, v. 29, Nov. 1954, p. 1315-1317.

Installations and procedures for short runs with frequent set-ups. Photographs, graphs.

See also:
2429 (metal-working oils)
2431 (coolants for band saws)
2616 (forging of drill rods)
3087 (machine shop waste oils)

METALS—METALLOGRAPHY, TRANSFORMATIONS, AND STRUCTURES

2771 Twinned Crystals. R. W. Cahn. *Advances in Physics*, v. 3, Oct. 1954, p. 363-445.

Types and nature of twinning. Growth and transformation twinning. Deformation twinning. Diagrams, tables. 240 ref.

2772 Electronic Structure of Primary Solid Solutions in Metals. J. Friedel. *Advances in Physics*, v. 3, Oct. 1954, p. 446-507.

Lattice structures. Molecular orbitals. Diagrams, graphs, tables. 110 ref.

2773 An X-Ray Diffraction and Vapor Pressure Investigation of the Rhenium-Germanium Phase Diagram. Alan W. Searcy, Robert A. McNees, Jr., and John M. Criscione. *American Chemical Society, Journal*, v. 76, Nov. 5, 1954, p. 5287-5289.

One germanide ($ReGe_2$) was found, and some of its properties were determined. Table, graph, phase diagram. 8 ref.

2774 Coercive Force: Possible Measure of Degree of Malleablization. D. S. Eppelsheimer and D. S. Gould. *American Foundryman*, v. 26, Nov. 1954, p. 41-43.

Magnetic measurements agree with hardness and metallographic tests. Photographs, graphs, micrographs. 4 ref.

2775 Metals With Whiskers. Sydney M. Arnold. *Bell Laboratories Record*, v. 32, Nov. 1954, p. 417-420.

Conditions of growth on electronic components. Photographs, micrographs.

2776 A Method of Examining Selected Areas of Surfaces Using Replicas and the Electron Microscope. G. R. Booker. *British Journal of Applied Physics*, v. 5, Oct. 1954, p. 349-350.

Use of wet-stripped replicas. Diagram, micrograph. 6 ref.

2777 Structure of Metals and Alloys After Vacuum Heating. L. I. Shushpanov. *Henry Brutcher, Altadena, Calif., Translation no.* 3304, 13 p. (From *Metallurg*, v. 12, no. 6, 1937, p. 31-36.)

Early Russian study of transformations occurring in plain C and low alloy steels, Cu, and white iron within temperature range of 1100 to 2200 F. Diagram, micrographs. 6 ref.

2778 Metallographic Investigation of the Tempering of Quenched High-Carbon Steel. A. P. Gulyaev and M. P. Zel'bet. *Henry Brutcher, Altadena, Calif., Translation no.* 3390,

Metals—Metallography, Transformations, and Structures

6 p. (From *Izvestiya Akademii Nauk SSSR*, 1954, no. 3, Mar., p. 83-87.)

Effect of tempering to 210, 390, 480, 570, and 930 F upon microstructure and microhardness of specimens. Graphs, micrographs, tables. 3 ref.

2779 On the Determination of Nonmetallic Inclusions in Steel. Yu. T. Lukashevich-Duvanova. *Henry Brutcher, Altadena, Calif., Translation no.* 3394, 19 p. (Condensed from *Metallurg*, v. 11, no. 5, 1936, p. 19-33.)

Critical review of the various methods of determining the nature of nonmetallic inclusions in steel (electrolytic, chlorine, nitric acid residue methods). Tables, micrographs. 11 ref.

2780* Lines in High-Chromium Steels. **Les lignes dans les aciers à haute teneur en chrome.** (French.) Berger. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques*, v. 11, no. 11, 1954, p. 2106-2111.

Study of inclusions caused by solidification phenomena. Corrective measures are indicated. Table, graph, micrographs.

2781* Slag Inclusions in Ingots. **Inclusions de laitier dans les lingots.** (French.) Cloppet. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques*, v. 11, no. 11, 1954, p. 2111-2118.

Discusses factors influencing the formation of inclusions at the surface of various special steel ingots during casting. Tables.

2782* Experimental Thermodynamic Study of the Platinum-Copper Superlattice. **Étude thermodynamique expérimentale de la surstructure platine, cuivre PtCu.** (French.) Pierre Assayag and Maurice Dodé. *Comptes rendus*, v. 239, no. 13, Sept. 27, 1954, p. 762-764.

Oxidation equilibrium pressures of Pt-Cu alloys to prove existence of zones of composition for which the alloy is made up of two phases in equilibrium, and to determine with precision the composition of these phases. Graphs. 3 ref.

2783* Micrographic Study at High Resolution of the First Stages of Aging of an Aluminum-Copper Alloy. **Étude micrographique à haute résolution des premiers stades due vieillissement d'un alliage aluminium-cuivre.** (French.) Raymond Castaing and Gabriel Lenoir. *Comptes rendus*, v. 239, no. 16, Oct. 18, 1954, p. 972-974.

Electron micrographs show characteristic heterogeneities. Micrographs.

2784* The Showing of Intercrystallite Internal Adsorption in Aluminum Alloys by the Method of Microhardness. **Vyiavlenie mezhkristallitnoi vnutrennei absorptsii v aliuminievykh splavakh metodom mikrotverdosti.** (Russian.) V. I. Arkharov, I. P. Berenova, and N. A. Kozina. *Doklady Akademii Nauk SSSR*, v. 98, no. 2, Sept. 11, 1954, p. 207-209.

Variation in microhardness according to grain size, aging, and heat treatments. Graphs. 1 ref.

2785* Determination of the Number of Vacancies and of the Energy of Vacancy Formation in Metals and Alloys. **Ob opredelenii chisla dyrok i energii dyrkoobrazovaniia v metallakh i splavakh.** (Russian.) S. D. Gertsriken. *Doklady Akademii Nauk SSSR*, v. 98, no. 2, Sept. 11, 1954, p. 211-213.

Temperature and its effect on the change in the length of specimen. Quenching from high temperatures fixes vacancies. Graphs, table. 10 ref.

2786* Accelerated Graphitization of White Cast Iron With Increased Chromium Content. **Uskorennaia grafitizatsiia belykh chugunov s povyshennym soderzhaniem khroma.** (Russian.) M. A. Krishtal. *Doklady Akademii Nauk SSSR*, v. 98, no. 4, Oct. 1, 1954, p. 583-584.

Relation between speed of graphitization and Sb content. Graph. 5 ref.

2787 The Role of Inverse Segregation and Redistribution of Solute Atoms in the Freezing of Hypoeutectic Lead-Antimony Alloys. A. C. Simon and E. L. Jones. *Electrochemical Society, Journal*, v. 101, Nov. 1954, p. 536-545.

Causes of Sb segregation at faces of battery grid castings. Micrographs, diagram, graphs. 39 ref.

2788 Diffusion of Hydrogen and Deuterium in High Purity Zirconium. Earl A. Gulbransen and Kenneth F. Andrew. *Electrochemical Society, Journal*, v. 101, Nov. 1954, p. 560-566.

Reactions are diffusion controlled. Experimental data fit theoretical explanations. Graphs, tables. 17 ref.

2789 High Temperature Crystal Structure of Thorium. Premo Chiotti. *Electrochemical Society, Journal*, v. 101, Nov. 1954, p. 567-570.

X-ray diffraction patterns and electrical resistivity show transformation from face-centered to body-centered cubic at ± 1400 C. Carbon increases transformation temperature. Diagram, graphs, micrograph. 6 ref.

2790* Aging Phenomena of Steam Boilers. **Alterungserscheinungen an Dampfkesseln.** (German.) V. Jareš. *Energietechnik*, v. 4, no. 9, Sept. 1954, p. 412-413.

Causes of embrittling. Proposed prevention includes operating the boiler below 13 atmospheres or the use of aging-resistant sheet steel. Graphs. 2 ref.

2791 The Ageing Characteristics of Some Ternary Aluminium-Copper-Magnesium Alloys With Copper : Magnesium Weight Ratios of 7:1 and 2·2:1. H. K. Hardy. *Institute of Metals, Journal*, v. 83, Sept. 1954, p. 17-34.

Hardness vs. aging-time curves were obtained at 30, 110, 130, 165, 190, 220, 240, and 260 C. Form of curves explains effects of increasing Mg on hardness. Graphs, tables. 96 ref.

2792 A High-Resolution Evaporated-Carbon Replica Technique for the Electron Microscope. D. E. Bradley. *Institute of Metals, Journal*, v. 83, Sept. 1954, p. 35-38 + 2 plates.

Two-stage replica technique using an intermediate Formvar film. Resolution is better than 50 A. Diagrams, micrographs. 9 ref.

2793 The Solid Solution of Cadmium in Zinc. J. R. Brown. *Institute of Metals, Journal*, v. 83, Oct. 1954, p. 49-52.

Lattice parameter measurements of quenched alloys. Solubility of 1.83 wt.% is lower than previously reported. Tables, graphs. 7 ref.

2794 Growth Twins in Crystals of Low Co-Ordination Number. E. Billig. *Institute of Metals, Journal*, v. 83, Oct. 1954, p. 53-56 + 2 plates.

Studies on single crystals of Ge and Si suggest a mechanism of twin formation. Diagram, table, graph, photographs.

2795 The Bainitic Transformation of the Beta Phase in Copper-Zinc Alloys. R. D. Garwood. *Institute of Metals, Journal*, v. 83, Oct. 1954, p. 64-68 + 1 plate.

Studies on alloy with 41.3% Zn from 170 to 470 C show mechanism is similar to bainitic transformation in steel. Graphs, tables, micrographs, diffraction pattern. 12 ref.

2796 Diffusion of Nitrogen and Oxygen in Titanium. R. J. Wasilewski and G. L. Kehl. *Institute of Metals, Journal*, v. 83, Nov. 1954, p. 94-104 + 1 plate.

Tests in range 900 to 1570 C show diffusion rate for N is independent of concentration while rates for O decrease at higher concentrations. Graphs, micrographs. 22 ref.

2797 Isothermal Transformations of Eutectoid Aluminium Bronzes. R. Haynes. *Institute of Metals, Journal*, v. 83, Nov. 1954, p. 105-114 + 1 plate.

Time-temperature-transformation diagrams for the range 350 to 560 C; Ni has little effect on transformation rate. Tables, diagrams, graphs, micrographs. 23 ref.

2798 How Austenitizing Conditions Affect Medium Alloy Steels. I-II. A. R. Troiano and R. F. Hehemann. *Iron Age*, v. 174, Nov. 11, 1954, p. 124-126; Nov. 18, 1954, p. 151-153.

Ms temperature can be raised 100 F in medium alloy steels thus reducing residual stresses and retained austenite. Graphs, tables, micrographs. 6 ref.

2799 Physical Chemistry of Steel. II. Experimental Evidence. J. A. Kitchener. *Iron & Steel*, v. 27, Nov. 1954, p. 523-526.

Thermodynamics and structure of solutions in liquid Fe. Table, graphs. 20 ref.

2800 Physical Chemistry of Steel. III. Interaction Effects Between Solutes. J. A. Kitchener. *Iron & Steel*, v. 27, Dec. 1954, p. 553-556.

Thermodynamics and structures of solutions in liquid Fe. Interactions of C, S, O, Si, and N. Graphs. 22 ref. (To be concluded.)

2801* Diffusion in Metallic Solid Solutions. **Diffusion i fasta metalliska lösningar.** (Swedish.) U. Landergren. *Jernkontorets Annaler*, v. 138, no. 10, 1954, p. 619-642.

Fick's law of diffusion. The Kirkendall effect. Probable mechanism of diffusion in face-centered cubic metals. Graphs, diagrams. 65 ref.

2802 Conditions for Porosity Formation During Diffusion. R. W. Balluffi and L. L. Seigle. *Journal of Applied Physics*, v. 25, Nov. 1954, p. 1380-1382.

Formal relationships defining the regions of the diffusion zone where porosity tends to form during the Kirkendall effect. 9 ref.

2803 Effect of Carbon Content on the 500°F Embrittlement of Tempered Martensite. P. Payson. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Nov. 1954, p. 1242-1243.

Decomposition of martensites ocntaining 0.06, 0.13, and 0.25% C. Graphs. 5 ref.

2804 An Examination of the Decrease of Surface-Activity Method of Measuring Self-Diffusion Coefficients in Wustite and Cobaltous Oxide. R. E. Carter and F. D. Richardson. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Nov. 1954, p. 1244-1257.

Radioisotopes were used to show Co diffuses via vacant cation sites. Below 850 C the surface activity method is not satisfactory for wustite. Tables, diagram, micrographs, photographs, graphs. 22 ref.

2805 Effect of Nitrogen on Sigma Formation in Cr-Ni Steels at 1200°F (650°C). G. F. Tisinai, J. K. Stanley, and C. H. Samans. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Nov. 1954, p. 1259-1267.

Nitrogen causes significant shifts of phase boundaries in the sigma region. Tables, micrographs, graphs. 7 ref.

2806 Titanium-Manganese Phases. Harold Margolin and Elmars Ence. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Nov. 1954, p. 1267-1268.

Tests on alloys between 31 and 70% Mn show from four to six phases exist. Table, micrograph. 7 ref.

2807 Stabilization of the Bainite Reaction. R. F. Hehemann and A. R. Troiano. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Nov. 1954, p. 1272-1280.

Influence of partial high temperature decomposition on reaction kinetics at lower temperatures for two alloy steels. Table, graphs, micrographs. 26 ref.

2808 Data for One of the Martensitic Transformations in An 11 Pct Mo-Ti Alloys. S. Weinig and E. S. Machlin. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Nov. 1954, p. 1280-1281.

Experimental data on habit orientation, lattice relations, shear strain, and orientation of subband markings. Tables, micrograph, diagram. 4 ref.

2809* Liberation of Gases Dissolved in Metal. **Vydelenie gazov, rastvorennykh v metalle.** (Russian.) D. P. Lovtsov. *Liteinoe Proizvodstvo*, 1954, no. 5, Aug., p. 24-25.

Experiments on Al alloys and silicon brass were used to establish a theory of solubility and evolution of gases by metals. Graph, diagrams, photographs.

2810 Graphitization in Steel. A. M. Hall. *Materials & Methods*, v. 40, Nov. 1954, p. 96-99.

Nature of graphitization, effects on steel properties, mechanism of formation, and its prevention. Micrographs, diagram, photographs, graph, table. 10 ref.

2811 Spheroidal Graphite Formation. E. Ward. *Metallurgia*, v. 50, no. 300, Oct. 1954, p. 155-158.

Discussion of various theories. Micrographs. 20 ref.

2812 Some Experiences With a New Metallurgical Mounting Plastic. P. A. Lovett. *Metallurgia*, v. 50, no. 300, Oct. 1954, p. 201-203.

Experience with a cold-setting plastic. Photograph, micrographs.

2813* On the Diffusion Mechanism in Interstitial Solid Solutions. **Über den Diffusionsmechanismus in Einlagerungsmischkristallen.** (German.) Hermann Schumann. *Metallurgie und Giessereitechnik*, v. 4, no. 9, Sept. 1954, p. 385-388.

Geometry of place-change process and importance of diffusion rate of interstitial particles to the cloud theories, especially from the standpoint of embrittling of Fe and steel. Tables, diagrams, graphs. 13 ref.

2814* Crystallographic Calculations for Cubic Metals. **Calculs cristallographiques pour les métaux cubiques.** (French.) Micheline Sternberg. *Métaux, Corrosion-Industries*, v. 29, no. 349, Sept. 1954, p. 335-346.

Crystallographic analysis of a simple Laue diagram. Diagrams, photograph, tables. 2 ref.

2815* The Crystal Structures of ZrSi and $ZrSi_2$. **Die Kristallstrukturen von ZrSi and $ZrSi_2$.** (German.) H. Schachner, H. Nowotny, and H. Kudielka. *Monatshefte für Chemie*, v. 85, no. 5, Oct. 15, 1954, p. 1140-1153.

X-ray studies. Tables, graph, diagram. 11 ref.

2816* Orientation Relationships and Growth in the Recrystallization of Aluminum. **Orientierungsbeziehungen und Wachstum bei der Rekristallisation von Aluminium.** (German.) Bernhard Liebmann. *Naturwissenschaften*, v. 41, no. 19, Oct. 1, 1954, p. 447-448.

Experimental study of the relationship between recrystallization and deformation, and rate of crystal growth as a function of annealing time. Diagrams, graph. 3 ref.

2817* Utilizing the Electron Microscopic Depth of Focus for Recordings of Low Magnification. **Ausnutzung der elektronenmikroskopischen Tiefenschärfe für die Aufnahmen geringer Vergrösserung.** (German.) F. Leonhard. *Optik*, v. 11, no. 9, 1954, p. 407-411.

Application to coarse structures of metallographic specimens. Micrographs. 1 ref.

2818* Experimental Studies on Contrast in the Electron Microscope. **Experimentelle Studien über den Kontrast im Elektronenmikroskop.** (German.) W. Lippert. *Optik*, v. 11, no. 9, 1954, p. 412-421.

Differences in transmission factors of equally prepared foils and use of transmission-factor measurements for thickness determinations. Graphs, micrographs. 14 ref.

2819 Diffusion of Cadmium, Indium, and Tin in Single Crystals of Silver. C. T. Tomizuka and L. Slifkin. *Physical Review*, v. 96, ser. 2, Nov. 1, 1954, p. 601-615.

Diffusion coefficient of radioactive tracers were measured at 592 to 937 C. Graphs, tables. 15 ref.

2820 Effect of Precipitation Hardening on the Superconducting Transition of an Aluminum Alloy. R. E. Mould and D. E. Mapother. *Physical Review*, v. 96, ser. 2, Nov. 1, 1954, p. 797-798.

Effect of heat treatment on Al and 63S Al alloy. Graphs. 3 ref.

2821 Dislocations. A Review of Some Recent Books. M. A. Jaswon. *Research*, v. 7, Nov. 1954, p. 457-464.

Theory. Strain energy. Edge and screw dislocations. Stress boundaries. Diagrams. 4 ref.

Metals—Metallography, Transformations, and Structures

2822* Contribution to the Study of Electrolytic Extraction of Carbides From High Speed Steel. **Contribution à l'étude de l'extraction électrolytique des carbures d'un acier à coupe rapide.** (French.) J. Papier. *Revue de métallurgie*, v. 51, no. 10, Oct. 1954, p. 723-734; disc., p. 734.

Amount and nature of carbides not dissolved after austenitizing at various temperatures and times. Tables, graphs, micrographs, diagram.

2823* Phenomenon of "Resorption" of the Diffusion Layer of Chromium-Plated Steel at High Temperatures. **Iavlenie "Rassasyvaniia" diffuzionnogo sloia khromirovannoi stali pri vysokikh temperaturakh.** (Russian.) G. N. Dubinin. *Vestnik Mashinostroeniia*, v. 34, no. 10, Oct. 1954, p. 84-87.

Tests on Fe, carbon steel, and stainless steels at 900 to 1100 C under vacuum for 10, 30, 60, and 120 hr.

2824* Dispersion and Symmetry of the Texture of Sheet Metals Investigated on the Example of Aluminum Foils. **Über Streuung und Symmetrie der Textur von Blechen, untersucht am Beispiel einer Aluminiumfolie.** (German.) Johanna Grewen and Günter Wassermann. *Zeitschrift für Metallkunde*, v. 45, no. 10, Oct. 1954, p. 570-576.

Texture determination by the counting tube process. Table, graph, pole figures. 14 ref.

2825* Structural Phenomena in the Segregation of Homogenized Aluminum-Zinc-Magnesium Alloys. **Gefügeerschienungen bei der Entmischung homogenisierter Aluminum-Zink-Magnesium-Legierungen.** (German.) Paul Brenner and Margarete Schippers. *Zeitschrift für Metallkunde*, v. 45, no. 10, Oct. 1954, p. 577-583.

Determination of recrystallization and grain-boundary displacements after solution treatment; appearance of a substructure on segregation of the solid solution explained by polygonization and precipitation on subgrain boundaries. Table, graph, micrographs. 13 ref.

2826* Rolling and Recrystallization Textures of Aluminum. Texture Investigations on Hot-Rolled Sheet Aluminum. **Walz- und Rekristallisationstexturen von Aluminium. Texturuntersuchungen an warmgewalzten Aluminiumblechen.** (German.) Wolfgang Bunk, Kurt Lücke and Georg Masing. *Zeitschrift für Metallkunde*, v. 45, no. 10, Oct. 1954, p. 584-593.

Effect of rolling and heat treating on the texture of thin and heavy sheet Al. Table, pole figures. 11 ref.

2827* X-Ray Investigations on the Age Hardening of an Aluminum-Copper Alloy With Small-Angle Oscillation Photography. **Röntgenographische Unterschungen über die Aushärtung einer Aluminium-Kupfer-Legierung mit Kleinwinkel-Schwenkaufnahmen.** (German.) Volkmar Gerold. *Zeitschrift für Metallkunde*, v. 45, no. 10, Oct. 1954, p. 593-599.

Studies on 5% Cu alloy aged for varying periods at room temperature to 220 C indicate both room- and high-temperature hardness zones. Graph, diagram, diffractograms. 22 ref.

2828* On the Structure of the States Arising From the Age Hardening of an Aluminum-Copper Alloy. **Über die Struktur der bei der Aushärtung einer Aluminium-Kupfer-Legierung auftretenden Zustände.** (German.) Volkmar Gerold. *Zeitschrift für Metallkunde*, v. 45, no. 10, Oct. 1954, p. 599-607.

Lattice models indicate a monoatomic layer of Cu atoms parallel to (001); relationship of high-temperature age hardening to precipitation of θ'' and θ' transition phases. Graphs, diagrams, tables, diffractograms. 18 ref.

Books and Miscellaneous Publications

2829 Dislocations in Metals. Morris Cohen, editor. 200 p. 1954. American Institute of Mining and Metallurgical Engineers, New York. (TN690 C66d)

Includes "The Nature of Dislocations in Ideal Single Crystals", J. S. Kolhler and F. Seitz; "Role of Dislocations in Crystal Growth and Grain Boundary Phenomena", W. T. Read, Jr. and W. Shockley; and "Dislocations and Mechanical Properties", E. Orowan.

2830 The Microscopy of Metals. 132 p. 1954. Institution of Metallurgists, London. (TN690 In7m)

Five papers covering microscopes and techniques; general metallography; use of polarized light in metallography; hot stage microscopy; phase-contrast and interference metallography.

See also:
2401 (transformation kinetics)
2624 (diffusivity of carbon in steel)
2639 (recrystallization of Al)
2692 (structures of stainless steel containing boron)

METALS—POWDER

2831 Contribution to the Theory and Practice of Pressing Powdered Materials. C. Ballhausen. *Henry Brutcher, Altadena, Calif., Translation no.* 3393, 21 p. (From *Archiv für das Eisenhüttenwesen*, v. 22, nos. 5-6, 1951, p. 185-196.)

Behavior of powdered metals in dies. Graphs, photographs, diagrams, tables.

2832 Powder Metallurgy Permits Good Control Over Combined Properties. F. R. Farnham. *Iron Age*, v. 174, Nov. 25, 1954, p. 102-105.

Advantages for use as electrical contacts. Production techniques. Photographs, diagrams, table. 1 ref.

2833* Highly Heat-Resistant Sintered Materials. **Hochwarmfeste Sinterwerkstoffe.** (Dutch.) Richard Kieffer. *IVA Tidskrift för Teknisk-Vetenskaplig Forskning*, v. 25, no. 6, 1954, p. 264-280.

Review of manufacture and properties of high-temperature alloys, carbides, borides, silicides, and oxides. Graphs, tables, diagrams, photographs. 42 ref.

2834 Applicability of Powder Metallurgy to Problems of High Temperature Materials. G. M. Ault and G. C. Deutsch. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Nov. 1954, p. 1214-1226; disc., p. 1227-1230.

Review of attempts to solve high temperature problems in use of wrought and sintered super alloys, Al, Mo, and cermets. Tables, micrographs, graphs, photographs, diagrams. 47 ref.

2835 Powdered Metal Parts Find Increasing Automotive Applications. D. B. Martin. *Machinery*, v. 61, Nov. 1954, p. 192-197.

Powder processes offer purer, more uniform materials at lower costs. Photographs, diagrams.

2836 Specially Bonded Silicon Carbide. W. L. Wroten. *Materials & Methods*, v. 40, Nov. 1954, p. 83-85.

Silicon nitride as bonding agent gives improved high temperature strength, closer size tolerances, and high abrasion and corrosion resistance. Table, graph, photographs.

2837 Pressing Parts From Powdered Metals—A New Concept. Byron B. Belden. *Mechanical Engineering*, v. 76, Nov. 1954, p. 891-896.

Advance in press design permits use of simpler die sets in pressing thin-wall bushings and compacting and pressing flanged parts. Diagrams, photograph.

2838 Sintering. Carl G. Paulson. *Metal Progress*, v. 66, Nov. 1954, p. 122-123, 176.

Effects of atmosphere on sintering processes.

2839* Iron Rotating Bands. John D. Dale. *Ordnance*, v. 39, Nov.-Dec. 1954, p. 498-501.

Production, properties, and specifications for sintered Fe projectile parts. Tables.

2840* Some Aspects of Powder Metallurgy. **Quelques aspects de la métallurgie des poudres.** (French.) Robert Girschig. *Revue de métallurgie*, v. 51, no. 10, Oct. 1954, p. 665-673.

Review of theoretical consequences of differences between cast and sintered metals. Industrial applications. Diagrams, micrograph, graph, photograph.

See also:
2509 (carbide forming tools)

MINING ENGINEERING

2841 The Value of Oil Emulsion Drilling Muds in Canada. John C. Luck, Jr. *Canadian Mining and Metallurgical Bulletin*, v. 47, no. 511, Nov. 1954, p. 756-757; *Canadian Institute of Mining and Metallurgy, Transactions*, v. 57, 1954, p. 494-495.

Advantages of oil emulsions over water-base muds. Table. 2 ref.

2842* Electric Rotary Drilling in Iron Ore. E. W. Hurd. *Colliery Guardian*, v. 189, Nov. 11, 1954, p. 619-624.

Design and construction of drilling machine for use in preparing blasting holes in iron-ore mines. Photographs, diagrams.

2843* Dynamic Principles of Mud Pump Operation Using Torque Converter Drive. Gene Shiels. *Drilling*, v. 16, Nov. 1954, p. 68-73, 129-130.

Includes diagrams, graphs, tables, photographs. 4 ref.

2844* The Technical Development in German Coal Mining. **Die technische Entwicklung im deutschen Steinkohlenbergbau.** (German.) Emil Stein. *Glückauf*, v. 90, nos. 43-44, Oct. 23, 1954, p. 1386-1396.

Advances in technical, economic, safety, sanitation, and personnel fields. Graphs, tables.

2845 Borehole Camera Is Milestone in Subsurface Exploration. E. B. Burwell, Jr. and R. H. Nesbitt. *Journal of Metals*, v. 6, Nov. 1954, p. 1197-1198.

Camera for examining interiors of pipes, wells, and conduits. Diagrams, photograph.

2846 A Low Cost Method of Production Stimulation. A. W. Garst. *Journal of Petroleum Technology*, v. 6, Nov. 1954, p. 10-15.

Increasing recovery of petroleum from oil wells by water-block removal. Tables, graphs.

2847 Optimum Sand Concentrations in Well Treatments. Peter Dehlinger, W. H. Browne, and C. O. Bundrant. *Journal of Petroleum Technology*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 201, Nov. 1954, p. 35-40.

Laboratory studies of gel-sand and oil-sand treatments. Graphs, diagrams.

2848 Measurement of Resistance to Flow of Fluids in Natural Gas Wells. R. V. Smith, R. H. Williams, and E. J. Dewees. *Journal of Petroleum Technology*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 201, Nov. 1954, p. 41-48.

Transmission factors for pipes and casings. Table, graphs. 12 ref.

2849 The Pumpability of Clay-Water Drilling Fluids. I. Havenaar. *Journal of Petroleum Technology*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 201, Nov. 1954, p. 49-55.

Pressure losses in drill-pipe and bit-nozzles. Graphs, tables. 12 ref.

2850* Drilling Techniques on the Colorado Plateau. R. G. Sullivan. *Mines Magazine*, v. 44, Oct. 1954, p. 23-25, 56.

Review of strength and weakness of each type of drill, new developments in each category, and the range of present contract prices. Photographs, table.

2851* Material, Treatment and Design for Drill Rods. T. E. Norman. *Mining Congress Journal*, v. 40, Nov. 1954, p. 31-34, 101.

Mechanical properties, heat and surface treatments, and corrosion fatigue properties of C and alloy steels for drill rods. Tables, graphs, photographs, micrographs.

2852* The Creation of New Drilling Equipment by the "Ural Machinery Plant" and Its Effectiveness in Drilling Oil Wells up to 3000 and 5000 Meters Deep. **Sozdanie novykh burovykh ustanovok Uralmashzavoda i effektivnost' ikh vnedreniia pri burenii skvazhin glubinoi do 3000 i 5000 m.** (Russian.) L. I. Berkhman. *Neftianoe Khoziaistvo*, v. 32, no. 8, Aug. 1954, p. 12-16.

Description and performance characteristics of rotary drilling equipment. Tables.

2853* Alkaline-Free Argillaceous Slurries for Drilling Under Complicated Conditions. **Besshchelochnye glinistye rastvory dlia bureniia v oslozhnennykh usloviiakh.** (Russian.) G. N. Khangil'din, N. I. Skomorovskaia, and L. N. Strads. *Neftianoe Khoziaistvo*, v. 32, no. 9, Sept. 1954, p. 19-24.

Advantages over alkaline mixtures. Noncoagulation under action of electrolytes permits use in salt-bearing strata. Non-swelling of clay particles permits use in collapsing clay formations. Tables, graphs. 8 ref.

2854 What's New in Drilling Instruments? E. L. Decker and F. S. Crane. *Oil and Gas Journal*, v. 53, Nov. 29, 1954, p. 80-82.

Weight and speed indicators, hydraulic system instruments, torque gages, and auxiliary instruments. Diagrams.

2855 Lateral Drain Hole Drilling. H. John Eastman. *Petroleum Engineer (Management Edition)*, v. 26, Nov. 1954, p. B57 + 8 pages.

Discusses equipment development and results of method for increasing well production. Photographs, diagrams.

2856 Chemical Removal of Paraffin From Wells. Guy F. Williams. *Petroleum Engineer (Management Edition)*, v. 26, Nov. 1954, p. B75-B76, B80.

Economical cleaning of lead lines, tubing strings, and tanks may often be effected by proper solvent application. Photograph, diagram.

2857 Drill Pipe and Drill Collars. Fritz W. Schall. *Petroleum Engineer (Management Edition)*, v. 26, Nov. 1954, p. B95-B98.

Two basic protective measures for avoidance of and insurance against costly finishing jobs resulting from drill pipe failures; selection and maintenance of drill collars. Photographs, diagram, graph.

2858* Problem of Improving the Quality of Cutting Teeth for Cutting Machines. **K voprosu uluchsheniia kachestva rezhushchikh zubkov dlia vrubovykh mashin i kombainov.** (Russian.) E. S. Tovpenets, V. I. Piskun, L. B. Shlepchenko, P. P. Guliachenko, L. I. Leonov, and I. F. Potapov. *Ugol*, 1954, no. 10, Oct., p. 23-26.

Simplified designs of cutting teeth; mechanical properties; heat treatment and use of hard facing alloys. Tables, diagrams.

2859* Wear of Parts of Petroleum Equipment and Ways of Increasing Their Wear Resistance. **Iznos detalei neftianogo oborudovaniia i puti povysheniia ikh iznosostoikosti.** (Russian.) E. L. Markhasin. *Vestnik Mashinostroeniia*, v. 34, no. 10, Oct. 1954, p. 30-36.

Details of a three-cutter bit, "plunger-bushing", and "bucket-ring" assemblies of deep wells. Diagrams, table, photographs. 10 ref.

2860 Good Drilling Mud Practices Saved Them Time, Money. Fred L. Gaye. *World Oil*, v. 139, Nov. 1954, p. 162 +5 pages.

Outline of procedures and description of drilling fluid and performance. Photographs, graphs, table.

2861 Keys to Successful Competitive Drilling. II. Roy A. Bobo, Robert S. Hoch, and George S. Ormsby. *World Oil*, v. 139, Nov. 1954, p. 172-174, 176.

Designed to help drilling personnel understand the influence of formation characteristics and fundamentals of bit design to gain maximum bit footage. Photographs, graph, table. 2 ref.

Books and Miscellaneous Publications

2862 Canadian Mining Manual. R. C. Rowe, editor. 352 p. 1954. National Business Publications, Gardenvale, Quebec. (TN26 C16)

Eighteen papers and charts covering the fields of exploration and prospecting, mining, milling and metallurgy, plant engineering and maintenance, administration and management.

Mining Engineering

2863 The Fundamentals of Electric Log Interpretation. M. R. J. Wyllie. 126 p. 1954. Academic Press, New York. (TN269 W97f)

Explains underlying philosophy, the quantitative theory and its practice, and application to modern methods.

See also:
2493 (steels for rock drills)

NONDESTRUCTIVE TESTING

2864* Radiographic Properties of X-Rays in the Two- to Six-Million-Volt Range. Charles H. Goldie, Kenneth A. Wright, John H. Anson, Robert W. Cloud, and John G. Trump. *ASTM Bulletin*, 1954, no. 201, Oct., p. 49-54.

Theory and equipment for examining thick metal pieces. Graphs, tables. 9 ref.

2865* Nondestructive Methods of Examining Vessels and Pipe Lines. **Zerstörungsfreie Prüfverfahren bei der Untersuchung von Behältern und Rohrleitungen.** (German.) Rudolf Trumpfheller. *Brennstoff-Wärme-Kraft*, v. 6, no. 10, Oct. 1954, p. 401-404.

Measuring thicknesses and detecting numerous types of defects with ultrasonics, X-rays, and γ-rays. Diagrams.

2866 Ultrasonic Inspection by the Through-Transmission and Pulse-Reflection Methods. H. Krainer and E. Krainer. *Henry Brutcher, Altadena, Calif., Translation no.* 3378, (Abridged from *Archiv für das Eisenhüttenwesen*, v. 24, nos. 5-6, 1953, p. 229-236.)

Previously abstracted from original. See item 12893, v. 2, Nov. 1953.

2867 Quick and Precise Routine Determination of the Thickness of Steel Sheet From One Side. Friedrich Förster. *Henry Brutcher, Altadena, Calif., Translation no.* 3387, 12 p. (From Report No. 26, Institut Dr. Förster, Reutlingen (Germany), 1953, 15-page typescript.)

Description and performance of instrument. Graphs, diagrams, photographs. 6 ref.

2868 Hardness Tester Sorts Auto Engine Parts. Milton J. Diamond. *Electronics*, v. 27, Dec. 1954, p. 160-161.

Automatic sorter measures hardness of steel rocker arms for automobile engines. Nondestructive test using magnetic retentivity provides 100% inspection. Photographs, circuits.

2869* Examination of Internal Stresses With X-Rays. **Sledování vnitřního pnutí roentgenovými paprsky.** (Czech.) Petr Skulari. *Hutnické Listy*, v. 9, no. 9, 1954, p. 529-537.

Origin of internal stresses. X-ray techniques. Diagrams, diffractograms. 29 ref.

2870 Bibliography on Ultrasonic Delay Lines. M .D. Fagen. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Ultrasonics Engineering*, PGUE-2, Nov. 1954, p. 3-8. (TK1 In6.6u)

Seventy-eight references subdivided into general, transducers, media, applications, and circuitry.

2871 How to Check Accuracy of Ultrasonic Flaw Detection. Nicholas Grossman. *Materials & Methods*, v. 40, Nov. 1954, p. 100-101.

Method of setting ultrasonic equipment to detect flaws above a specified minimum size. Photographs, tables, diagram.

2872* Industrial Testing by Ultrasonics. **Contrôle industriel par les ultra-sons.** (French.) *Métallurgie et la construction mécanique*, v. 86, no. 9, Sept. 1954, p. 653, 655, 657.

Methods and advantages. Drawings. (To be continued.)

2873 X-Ray Techniques and High-Speed Recording. J. Savage and D. S. Box. *Metal Treatment and Drop Forging*, v. 21, Nov. 1954, p. 503-505.

Application of the principles of general physics. Diagram, graph. 3 ref.

2874 Radiographic Inspection Assures Sound Pipeline Welds. Harold Hovland. *Oil and Gas Journal*, v. 53, Nov. 15, 1954, p. 223-225, 228, 230.

Advantages; weld control; operator qualifications; radiographic costs. Photographs, tables. 2 ref.

2875* Nondestructive Metallographic Testing. **Roncsolásmentes metallográfiai vizsgálat.** (Hungarian.) István Mester and Erik Fuchs. *Öntöde*, v. 5, no. 10, Oct. 1954, p. 218-227.

Describes nondestructive testing of metals with simple apparatus such as microscopes and cameras. Procedures and results. Photographs, diagram, micrographs. 15 ref.

2876 ABC's of Ultrasonic Inspection. E. F. Weller, Jr. *Steel Processing*, v. 40, Nov. 1954, p. 706-714.

Principles, equipment, and applications. Diagrams, photographs. 11 ref.

Books and Miscellaneous Publications

2877 Electroacoustics. The Analysis of Transduction, and Its Historical Background. Frederick V. Hunt. Harvard Monographs in Applied Science No. 5. 260 p. 1954. John Wiley & Sons, New York. (TK5981 H91e)

Historical context, new method for analyzing electrostatic and electromagnetic systems of coupling and applications.

See also:
2089 (ultrasonic detection of corrosion)
2670 (nondestructive hardness testing)
2914 (radiographic inspection)
3077 (industrial use of radioactive isotopes)
3090 (disposal of C^{14})

NUCLEAR PHYSICS, NUCLEONICS, AND RADIATION

2878 Preparation, Identification and Crystal Structure of a Pentavalent Americium Compound, $KAmO_2F_2$. L. B. Asprey, F. H. Ellinger, and W. H. Zachariasen. *American Chemical Society, Journal*, v. 76, Oct. 20, 1954, p. 5235-5237.

Prepared by addition of KF to acid solution of Am^{+5}. Table. 8 ref.

2879 The Carrier-Free Separation of the Radioactive Isotopes Co^{56}, Co^{57} and Co^{58} From a Manganese Target. J. L. Dick and M. H. Kurbatov. *American Chemical Society, Journal*, v. 76, Oct. 20, 1954, p. 5245.

Alpha-Nitroso-β-naphthol is used. Graph. 1 ref.

2880 Problems Encountered in Routine Use of 10-Kilocurie, Gamma-Radiation Source. John V. Nehemias, L. E. Brownell, W. W. Meinke, and D. E. Harmer. *American Journal of Physics*, v. 22, Nov. 1954, p. 511-516.

Control of radiation levels, pH, and clarity of water in source storage well; breakdown of organic plastics; and discrepancy between nominal and apparent source strength. Diagrams, photographs, graphs, table. 15 ref.

2881 Studies of Intermediate and Heavy Nuclei With Neutrons. H. H. Barschall. *American Journal of Physics*, v. 22, Nov. 1954, p. 517-523.

Forces which govern interaction. Graphs. 27 ref.

2882* New Metals for Nuclear Technology. William A. Johnson. *American Society of Naval Engineers, Journal*, v. 66, Nov. 1954, p. 887-896.

Brief review of properties and applications of Be, Zr, and U.

2883* Contribution to the Study of Disintegration Schemes of Some α-Emitters. **Contribution a l'étude des schémas de désintégration de quelques émetteurs α.** (French.) Paul Falk-Vairant. *Annales de physique*, v. 9, 12me Série, Sept.-Oct. 1954, p. 524-581.

Theory of α emission, experimental techniques, and study of transmutations. Tables, graphs, drawings. 85 ref.

2884* Atmospheric Monitoring for Alpha Emitters Using Molecular Filter Membranes. Thomas T. Mercer. *Archives of Industrial Hygiene and Occupational Medicine*, v. 10, Nov. 1954, p. 372-380.

Includes tables, graphs, diagram. 11 ref.

2885* Measurement of the Wave Length of X-Rays. **Wellenlängenmessung der Röntgenstrahlen.** (German.) Hermann Weyerer. *Archiv für technisches Messen,* 1954, no. 225, Oct., p. 239-242.
Includes photograph, diagrams, table. 40 ref.

2886* **The Steam Turbine in the Atomic Power Station.** J. Lalive d'Epinay and W. Lüthi. *Brown Boveri Review,* v. 41, nos. 3-4, Mar.-Apr. 1954, p. 101-107.
Problems and possible solutions in feed-water heating. Graphs, diagrams.

2887* Amplitudes of Oscillations in the Strong Convergence Synchrotron. **Les amplitudes des oscillations dans le synchrotron à forte convergence.** (French.) Joseph Seiden. *Comptes rendus,* v. 239, no. 14, Oct. 4, 1954, p. 798-800.
Presents simple formulas for calculating amplitudes of oscillations effected by accelerated particles in a strong convergence synchrotron. 4 ref.

2888* Realist Theory of Pseudoscaler Mesons. **Théorie réaliste des mésons pseudoscalaires.** (French.) Bernard Jouvet. *Comptes rendus,* v. 239, no. 18, Nov. 3, 1954, p. 1121-1123.
Shows that the postulate for the existence of Fermi pseudoscalar couplings between nucleons and leptons implies the existence of pseudoscalar mesons. 2 ref.

2889* Measurements Relative to the Effective Fission Cross Section of Plutonium for Slow Neutrons. **Mesures relatives à la section efficace de fission du plutonium pour des neutrons lents.** (French.) Magda Galula, Bernard Jacrot, and Francis Netter. *Comptes rendus,* v. 239, no. 18, Nov. 3, 1954, p. 1128-1130.
Variation of the effective fission cross section of Pu with energy is determined for slow neutrons. Results are compared with those of U. Graphs. 2 ref.

2890 The Evolution of Particle Counters. H. Greinacher. *Endeavour,* v. 13, Oct. 1954, p. 190-197.
Development and characteristics of present types. Diagrams, photographs. 16 ref.

2891 Instrumentation and Control of the Brookhaven Nuclear Reactor. J. E. Binns. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Nuclear Science,* v. NS-1, no. 1, Sept. 1954, p. 2-7. (TK1 In6.6ns)
Operation of maintenance and safety features. Diagrams, circuits.

2892 A Constant Reactor-Outlet-Temperature Control System for Nuclear Power Plants. Gilbert S. Stubbs. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Nuclear Science,* v. NS-1, no. 1, Sept. 1954, p. 8-11. (TK1 In6.6ns)
Control of heat from nuclear core to steam plant boiler by gas or liquid coolant. Diagram. 5 ref.

2893 Electronic Equipment for an Electron Analogue Accelerator. J. G. Cottingham, M. Plotkin, and E. C. Raka. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Nuclear Science,* v. NS-1, no. 1, Sept. 1954, p. 12-15. (TK1 In6.6ns)
Electronic circuits for operating strong-focusing synchrotrons. Diagrams, circuits.

2894 Kinetics of Piles With Reflectors. V. H. Rumsey. *Journal of Applied Physics,* v. 25, Nov. 1954, p. 1395-1399.
An integral equation for the time-dependent reaction is derived on the basis of the two-group model of neutron multiplication.

2895* Some Techniques Used for the Protection of Personnel Susceptible to Radiation by Alpha and Gamma Rays and by Thermal and Slow Neutrons. **Sur quelques techniques employées pour la protection du personnel susceptible d'être irradié par les rayons α et γ et par les neutrons thermiques et lents.** (French.) M. P. Savel. *Journal de physique et le radium,* v. 15, no. 10, Oct. 1954, p. 113A-118A.
Use of radiographic films, and scintillation counters. Diagrams, table, photograph.

2896* A New Method of Studying Radioactive Phenomena: "Cinenucleography". **Sur une méthode nouvelle d'etude des phénomènes radioactifs: "Ciné-nucléographie".** (French.) Marcel Laporte. *Journal de physique et le radium,* v. 15, no. 11, Nov. 1954, p. 705-713.
Refinements in methods of studying traces in nuclear emulsions. Diagrams, graphs.

2897* Measuring the Activity of Alpha Emitters by Cinenucleography. **Mesure d'activité des émetteurs α par ciné-nucléographie.** (French.) O. Roehrich-Goussu. *Journal de physique et la radium,* v. 15, no. 11, Nov. 1954, p. 714-715.
Activity of Po determined by use of nuclear emulsions.

2898* Realization of Professor Laporte's Cinenucleograph. **Une réalisation du ciné-nucléographe de M. le Professeur Laporte.** (French.) Marcel Frilley. *Journal de physique et le radium,* v. 15, no. 11, Nov. 1954, p. 715-717.
Describes apparatus for recording, in the emulsion of a photographic plate, the trajectories of particles emitted by a movable radioactive source. Photograph, diagrams. 3 ref.

2899* Measuring the Energy of Electrons Recorded in Nuclear Emulsions. **Mesure de l'énergie des électrons enregistrés dans les émulsions nucléaires.** (French.) M. Maitrot and M. G. Marguin. *Journal de physique et le radium,* v. 15, no. 11, Nov. 1954, p. 718-725.
Energy spectrum of electrons from Ra*E*. Graphs, tables. 10 ref.

2900* Measuring the Life Span of μ Mesons. **Az μ-mezonok élettartamának méréséről.** (Hungarian.) V. Petržilka. *Magar Fizikai Folyóirat,* v. 2, no. 4, 1954, p. 297-300.
15 ref.

2901* Repulsive Forces in the Nucleus. **Taszító erők az atommagban.** (Hungarian.) Géza Szamosi. *Magyar Fizikai Folyóirat,* v. 2, no. 4, 1954, p. 313-319.
Reviews the literature. Proposes a two-nucleon atom model, taking into consideration the experimental data on the double-nucleon. 6 ref.

2902 Hot Labs. *Nucleonics,* v. 12, Nov. 1954, p. 35-100.
Thirty six papers on design, construction, and operation of laboratory equipment for handling radioactive materials. Includes data on manipulators and remote equipment for examining, sampling, analyzing, processing, and testing chemical and metallurgical specimens. Graphs, photographs, diagrams. tables.

2903 A Cloud Chamber Study of the Interactions of Fast μ-Mesons. V. Appapillai, A. W. Mailvaganam, and A. W. Wolfendale. *Philosophical Magazine,* v. 45, 7th ser., no. 369, Oct. 1954, p. 1059-1069.
A cloud chamber operating in a magnetic field was used to investigate the production of penetrating secondaries by μ-mesons at sea level. Graph, diagram, tables. 19 ref.

2904 A Search for Natural Radioactivity in Neodymium, Rhenium and Osmium. D. Dixon and A. McNair. *Philosophical Magazine,* v. 45, 7th ser., no. 370, Nov. 1954, p. 1099-1108.
Isotopes appear to have half-lives of the order of 10^{15} yr. Graphs, tables. 24 ref.

2905 Determination of the Ranges and Straggling of Low-Energy Alpha Particles in a Cloud Chamber. S. Barile, R. Webeler, and G. Allen. *Physical Review,* v. 96, ser. 2, Nov. 1, 1954, p. 673-678.
Includes diagrams, tables. 16 ref.

2906 Resonance Scattering of Gamma Rays by Nuclei. A. M. Cormack. *Physical Review,* v. 96, ser. 2, Nov. 1, 1954, p. 716-718.
Observation methods. Graph. 8 ref.

2907 Ionization Energy Loss of Mesons in a Sodium Iodide Scintillation Crystal. Theodore Bowen. *Physical Review,* v. 96, ser. 2, Nov. 1, 1954, p. 754-764.
Response of a Tl-activated NaI crystal to high-energy charged particles passing through the scintillator. Diagrams, graphs, tables. 38 ref.

Nuclear Physics, Nucleonics, and Radiation

2908 The Scattering of Nucleons by Alpha Particles-the s-Phases. S. Hochberg, H. S. W. Massey, and L. H. Underhill. *Physical Society, Proceedings*, v. 67, no. 419A, Nov. 1954, p. 957-966.

Calculations over the energy range 0-4 m.e.v. Graph. 22 ref.

2909 Theory of (d, p) and (d, n) Reactions. I. General Theory Ignoring Coulomb Effects. I. P. Grant. *Physical Society, Proceedings*, v. 67, no. 419A, Nov. 1954, p. 981-989.

Includes diagrams. 9 ref.

2910* Use of Radioactive Isotopes in Industry. **Primenenie radioaktivnykh izotopov v promyshlennosti.** (Russian.) M. B. Neiman. *Priroda*, v. 43, no. 10, Oct. 1954, p. 16-27.

Applications in metallurgy, nondestructive testing, chemical and petroleum industries, and communication. Table, diagrams, photographs, graphs.

2911* Use of Radioactive Tracers in a Study of Displacement in a Model 5-Spot System. R. E. Wainerdi and R. F. Nielsen. *Producers Monthly*, v. 18, Oct. 1954, p. 16-20.

A sealed alundum slab serves as a model with I^{131} as tracer. Diagrams, graphs, table. 12 ref.

2912 Power Reactors. Alvin M. Weinberg. *Scientific American*, v. 191, Dec. 1954, p. 33-39.

Equipment; fuels; efficiencies. Diagrams, table, photographs.

2913 The Ultimate Atom. H. C. Corben and S. De-Benedetti. *Scientific American*, v. 191, Dec. 1954, p. 88-90, 92.

Formation and detection of positroniums. Diagrams, photographs.

2914 Industrial Applications of Atomic Energy. Alfonso Tammaro. *Steel Processing*, v. 40, Nov. 1954, p. 715-722.

Uses of radioisotopes in various industrial and research problems. Principles of various reactors. Diagrams, photographs.

2915* Radiocarbon Dating. H. Barker. *Times Science Review*, 1954, Winter, p. 9.

Equipment and techniques for dating ancient material. Diagrams.

2916* The Masses of Intermediate-Weight Atoms and the Bonding Energies of Their Nuclei. **Massy srednikh atomov i energii sviazi ikh iader.** (Russian.) V. A. Kravstsov. *Uspekhi Fizicheskikh Nauk*, v. 54, no. 1, Sept. 1954, p. 3-181.

Mass-spectrographic studies. Nuclear reactions. Radioactive decay. Tables, graphs. 626 ref.

2917* Geochemistry of Isotopes. **Geokhimiia izotopov.** (Russian.) A. P. Vinogradov. *Vestnik Akademii Nauk SSSR*, v. 24, no. 5, May, 1954, p. 26-43.

Geographical distribution and age of radioactive isotopes in minerals, rocks, sea water, and organic matter. Tables, graph, maps, photograph.

2918* A New Method of Photometering the Track of Particles in a Photoemulsion. **Novyi metod fotometrirovaniia sleda chastits v fotoemul'sii.** (Russian.) Iu. P. Mironenko and Zh. S. Takibaev. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 27, no. 3 (9), Sept. 1954, p. 390-392.

Equipment and operation. Diagrams, graphs. 7 ref.

Books and Miscellaneous Publications

2919 Atomic Energy and Its Applications. J. M. A. Lenihan. Applied Physics Series. 265 p. 1954. Pitman Publishing Corp., New York. (QC792 L54a)

Simple account of the physical foundations of nuclear science, their applications, and a guide to future progress.

2920 The Hydrogen Bomb: The Men; The Menace; The Mechanism. James R. Shepley and Clay Blair, Jr. 244 p. 1954. David McKay Co., New York. (UF767 Sh48h)

History of events leading up to the explosion of the first H-bomb in Mar. 1954.

2921 Nuclear Reactor Development. Oliver Townsend and Edwin Wiggin, editors. 99 p. 1954. Atomic Industrial Forum, Washington, D. C. (QC776 At71n)

Eleven papers with discussions on reactor development of the AEC and private industry.

2922 Biological Effects of External X and Gamma Radiation. Raymond E. Zirkle, editor. Pt. I. 530 p. 1954. McGraw-Hill Book Co., New York. (QH652 Z68b)

A study of effects on life span, tissue metabolism, breeding behavior, enzyme activity, blood, carcinogenesis of experimental animals, and application of the results of the problem of human protection.

See also:
1618 (tracers in plant studies)
1630 (radiation genetics)
1654 (tracers in agricultural studies)
1664 (tracers in biochemistry)
1666 (tracers in biological studies)
1670 (radiation induced mutations)
1671 (X-ray induced mutations)
1679 (radioprotectors)
1682 (biological radiation effects)
1707 (tracers in study of concrete)
1923 (uses of C^{14})
1971 (chromatography of I^{131} in various esters)
2407 (neutron detector)
2440 (tracers in wear studies)
3017 (nuclear physics)
3048 (effects of radiation on vinyl polymers)

OPERATIONS RESEARCH AND MANAGEMENT ENGINEERING

2923 Paint Manufacturers and the Federal Trade Commission. Robley D. Stevens. *American Paint Journal*, v. 39, Nov. 1, 1954, p. 20, 22, 24, 26.

Reviews purpose and activities of this agency.

2924 Fatigue Reduction in the Paint Plant. Ernest W. Fair. *American Paint Journal*, v. 39, Nov. 1, 1954, p. 58, 60-61.

Economics of good design and administration.

2925 Better Design for Bulk Handling. Andrew W. Jenike. *Chemical Engineering*, v. 61, Dec. 1954, p. 175-180.

New experimental work points to a novel theory of bulk solids flow, quantitative approach to equipment design, and development of a "flow factor". Diagrams, photograph. 8 ref.

2926 Operations Research. Paul Ferencz. *Chemistry in Canada*, v. 6, Nov. 1954, p. 37-40.

Application of new techniques and an illustration of their use by industry to solve problems in inventory and competition. 9 ref.

2927* Handling Methods for Metals. Stanley S. Greene. *Flow*, v. 1, Nov. 1954, p. 75 + 19 pages.

Handling, storing, and positioning metal shapes; copper and brass warehouses. Photographs.

2928 New Experimental Designs for Paired Observations. W. J. Youden and William S. Connor. *Journal of Research, National Bureau of Standards*, v. 53, Sept. 1954, p. 191-196.

Techniques of selecting a statistically dependable subset. Tables.

2929* Universals in Management Planning and Controlling. J. M. Juran. *Management Review*, v. 43, Nov. 1954, p. 748-761.

Business administration principles. Diagrams, table.

2930 The British Iron and Steel Research Association. *Metallurgia*, v. 50, no. 300, Oct. 1954, p. 176-180.

Survey of more interesting projects. Photographs.

2931 The British Steel Castings Research Association. J. F. B. Jackson. *Metallurgia*, v. 50, no. 300, Oct. 1954, p. 183-186, 191.

Outline of research and development projects of current interest. Diagrams, photographs, micrographs.

2932 B.N.F.M.R.A. Service to Industry. B. Fullman and E. C. Mantle. *Metallurgia*, v. 50, no. 300, Oct. 1954, p. 187-191.

Services other than direct research provided by the British Non-Ferrous Metals Research Association. Graphs, photographs.

2933 Human Maintenance Pays Off! E. P. Luongo. *Petroleum Refiner*, v. 33, Nov. 1954, p. 134-136, 272-273.

How to reduce chronic disabilities among employees. Photographs.

2934 Social Security Act Adds More Security. Irvin S. Ladimer. *Petroleum Refiner*, v. 33, Nov. 1954, p. 260 + 5 pages.

Clear explanation of the new amendment. Tables.

2935* Management Development in the Plastics Industry. John D. Staley and Peter Blasczak. *Plastics Industry*, v. 12, Nov. 1954, p. 16-18.

Program for success in the small, but growing, plant. 1 ref.

2936* The Adequacy of Our Safety Programs. Harold H. Taylor. *Pulp and Paper Magazine of Canada*, v. 55, Oct. 1954, p. 208 + 5 pages.

Control of worker's attitude and reaction to safety regulations is stressed. Table.

Books and Miscellaneous Publications

2937 Stabilizing Construction: The Record and Potential. Miles L. Colean and Robinson Newcomb. 340 p. 1952. McGraw-Hill Book Co., New York. (HD9715 C67s)

Organization, characteristics, and potentials of the construction industry.

2938 Manpower in the United States: Problems and Policies. William Haber, Frederick H. Harbison, Lawrence R. Klein, and Gladys L. Palmer, editors. 225 p. 1954. Harper & Brothers, New York. (HD5723 H11m)

Utilization and motivation of workers. Changing dimensions of the work force. Manpower mobilization.

2939 Automatic Selling. G. R. Schreiber. 195 p. 1954. John Wiley & Sons, New York. (HF5483 Sch72a)

History, uses, and future prospects for automatic vending machines.

2940 Crystal Growth and Dislocations. Ajit Ram Verma. 182 p. 1953. Butterworths Scientific Publications, London. (QD905 V59c)

Recent developments with emphasis on spiral growth. Data from electron and phase contrast microscopy and multiple beam interferometry experiments.

2941 Human Engineering Guide for Equipment Designers. Wesley E. Woodson. Sections individually paged. 1954. University of California Press, Los Angeles. (TA175 W86h)

Workspace; vision; audition; body measurements and capabilities.

2942 Conference on Silicosis. Unpaged. 1954. McIntyre Research Foundation, Toronto, Canada. (RC776 M45c6)

Five papers on history, medical aspects, and dust control measures.

See also:
2465 (series planning for machines)
2484 (automatic factory)
2770 (quality control)
3139 (welding research)

ORE AND MATERIALS BENEFICIATION

2943* Development of a New Type of Hydraulic Separator. **Újtípusú hidraulikus osztályozó kialakítása.** (Hungarian.) András Halász and László Demeter. *Bányászati Lapok*, v. 9, no. 10, Oct. 1954, p. 516-522.

Hungarian experiments with dolomite and pyrite ore for the development of a closed circuit separator. Experimental arrangement, laboratory experiments, and evaluation of results. Photograph, tables, graphs.

2944 New Process for Heat Hardening Taconite Pellets. *Blast Furnace and Steel Plant*, v. 42, Nov. 1954, p. 1299-1303.

Design of equipment for reconstituting fine powder from taconite concentration processes. Diagrams, photograph.

2945 Wolframite (Iron Manganese Tungstate): Development of Deposits, Chemical Analysis, and Factors Affecting the Yield in the Extraction of the Metal. F. L. Casado. *Henry Brutcher, Altadena, Calif., Translation no.* 3314, 21 p. (From *Revista de la Academia de Ciencias de Madrid*, v. 39, 1945, p. 489-505.)

Study of preparation of tungstates on a pilot-plant scale. Tables. 27 ref.

2946 Physico-Chemical Principles of the Production of Ferroalloys. V. P. Elyutin and B. E. Levin. *Henry Brutcher, Altadena, Calif., Translation no.* 3405, 27 p. (From *Stal*, v. 7, no. 10, 1947, p. 903-910.)

Thermodynamics of chemical processes underlying the production of ferroalloys as a basis for selecting the most favorable production process, with special reference to reduction of Ti, Zr, W, Si, Al, and Mn. Graphs. 17 ref.

2947 How USBM Metallurgists Are Solving the Manganese Shortage. Charles Prasky. *Engineering and Mining Journal*, v. 155, Nov. 1954, p. 72-75.

Beneficiation of low-grade Mn-bearing materials by differential high-temperature sulfatization process. Photographs, diagrams.

2948 How Sulphide Volatilization Can Be Used in Metallurgy. A. W. Schlechten. *Engineering and Mining Journal*, v. 155, Nov. 1954, p. 81-83.

Principles, process and advantages of metal sulfide volatilization in recovery of valuable metals and in eliminating undesirable elements. Diagrams, graph, table.

2949 How Sheffield's Beneficiation Plant Upgrades Texas Iron Ores. C. Leonard Lloyd, Jr. *Engineering and Mining Journal*, v. 155, Nov. 1954, p. 98-100.

Brief geological background and description of the processing. Photographs.

2950* Separation of Middlings Into Four Parts for the Formation of Refuse of High-Carbon Content. **Viergutscheidung zur Gewinnung kohlenstoffreicher Berge.** (German.) Albrecht Haacke. *Glückauf*, v. 90, nos. 39-40, Sept. 25, 1954, p. 1243-1249.

Process and machinery with gravity-settling tank for concentrating the C content of coal washing refuse to at least 20% in order to render it a suitable fuel for gas generators. Graphs, photograph, farinograph, tables, diagrams. 4 ref.

2951* Sorting Crude Coarse Coal in a Drum Separator of the Schüchtermann & Kremer-Baum AG at the Haus Aden Mine. **Sortierung von Rohgrobkohle in einem Trommelscheider der Schüchtermann & Kremer-Baum AG. auf der Zeche Haus Aden.** (German.) Hans Paul. *Glückauf*, v. 90, nos. 39-40, Sept. 25, 1954, p. 1250-1257.

Description of heavy-liquid coal-washing machinery, evaluation of results, and break-down of operating costs. Photographs, diagrams, tables, graphs.

2952* Improvement of the Settling and Recovery Processes of Pneumatically Controlled Stream Washers of the Firm, Klöckner-Humboldt-Deutz AG. **Verbesserung des Setz- und Austragsvorganges an luftgesteuerten Stromsetzmaschinen der Firma Klöckner-Humboldt-Deutz AG.** (German.) Friedel Isenhardt. *Glückauf*, v. 90, nos. 39-40, Sept. 25, 1954, p. 1258-1262.

Description of the washer; measurement of pressure distribu-

Ore and Materials Beneficiation

tion and water flow, and an evaluation of its efficiency. Diagrams, graphs, photographs.

2953* Washing Fine Coal in High-, Middle-, and Low-Pressure Cyclones. **Aufbereitung von Feinkohle in Hoch-, Mittel-, und Niederdruckzyklonen.** (German.) Edwin Hoffman. *Glückauf*, v. 90, nos. 39-40, Sept. 25, 1954, p. 1262-1268.

Comparison of the efficiencies of washers; improvements; discussion of wear and costs of coal washing. Graphs, diagrams, tables, photographs. 1 ref.

2954* Heavy-Liquid Washing of Fine and Very Fine Grain in the Centrifugal Separator. **Die Schwerflüssigkeitsaufbereitung von Fein- und Feinstkorn im Schleuderscheider.** (German.) Rudolf Teuteberg. *Glückauf*, v. 90, nos. 39-40, Sept. 25, 1954, p. 1276-1282.

Principle of operation and separation process; test results; effect of the central water-field on the heavy-media suspension; and explanation of the low wear on the experimental equipment. Diagrams, photographs, graphs.

2955* New Possibilities of Static Dehydration. **Neue Möglichkeiten der statischen Entwässerung.** (German.) Kurt Lemke. *Glückauf*, v. 90, nos. 39-40, Sept. 25, 1954, p. 1283-1288.

Experimental investigation of dehydrating fine coal in towers by reducing the internal friction of water, or by changing the type of charging, dehydrating devices, and the form of the towers. Tables, graphs, diagrams. 7 ref.

2956* A New Wet-Mechanical Process of Reducing the Ash Content of Very Fine Crude Coal. **Ein neues nassmechanisches Verfahren zur Erniedrigung des Aschengehalts von Rohfeinstkohle.** (German.) Werner Gründer. *Glückauf*, v. 90, nos. 39-40, Sept. 25, 1954, p. 1288-1291.

Description of centrifugal basket separators and test results. Diagrams, photographs, tables. 5 ref.

2957 Bubble-Mineral Attachment in Flotation. L. F. Evans. *Industrial and Engineering Chemistry*, v. 46, Nov. 1954, p. 2420-2424.

Determination of rupture thickness; calculation of time available for contact; shape of bubble in contact with solid surface. Diagrams, graph, table. 14 ref.

2958 Sintering of Iron Ore for Blast Furnaces. *Industrial Heating*, v. 21, Nov. 1954, p. 2243-2244, 2246.

Effects of additives, moisture, and coke content.

2959 Inorganic Chromatography on Cellulose. XVI. The Preparation of Highly Purified Triuranium Octaoxide From Pitchblende. T. V. Arden. *Journal of Applied Chemistry*, v. 4, Oct. 1954, p. 539-543.

Uranyl nitrate, extracted with ether plus 3% HNO_3 is passed through the column to yield 99.9% of the U. Diagram, graphs, tables. 2 ref.

2960 Fundamentals of Mixing and Agitation With Applications to Extractive Metallurgy. J. H. Rushton and L. H. Mahony. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Nov. 1954, p. 1199-1206.

Equipment and practices for improving handling, blending, flotation, and leaching operations. Photographs, diagrams, tables, graph. 3 ref.

2961* Processing of Calcium-Aluminate Slag in the Alumina Industry. **Kalcium-aluminát-salakok timföldgyári felhasználása.** (Hungarian.) István Magyarossy, Dénes Bartók, and András Héjja. *Kohászati Lapok*, v. 9, no. 10, Oct. 10, 1954, p. 467-474.

Use of concentrated sodium carbonate solutions. Possibilities of combining this process with the Bayer process. Diagrams, tables.

2962* Production of Electrolytic Zinc From Zinc Blende of the Freiberg Ore Region. **Die Gewinnung von Elektrolytzink aus Zinkblende des Freiberger Erzreviers.** (German.) Kurt Peukert and Willy Schreiter. *Metallurgie und Giessereitechnik*, v. 4, no. 9, Sept. 1954, p. 397-401.

Roasting, leaching, and electrolysis. Tables. 4 ref.

2963 Acid Pressure Digestion of Metal Ores. Phillip Malcolm James Gray. *Research*, v. 7, Nov. 1954, p. 432-436.

Chemical methods of ore concentration. Engineering aspects. Applications.

2964* On the Magnetic Property of Iron Oxides. (English.) Hiroshi Kojima. *Science Reports of the Research Institutes, Tohoku University*, ser. A, v. 6, no. 2, Apr. 1954, p. 178-185.

Magnetic behavior of α ferric oxide during reduction and magnetite during oxidation; chemical and X-ray analysis. Tables, graphs, diagram, micrograph. 5 ref.

2965* Influence of Coal Flotation Concentrate on the Quality of Blast-Furnace Coke. **Vliianie ugol'nogo flotokontsentrata na kachestvo domennogo koksa.** (Russian.) V. L. Levin. *Ugol*, 1954, no. 9, Sept., p. 32-37.

Use of coal cleaned by flotation methods resulted in coke having good mechanical properties and low phosphorus content. Tables, graphs, photographs.

2966 Metallurgical Tests on Scappoose (Oregon) Iron Ore. J. P. Walsted. *U. S. Bureau of Mines, Report of Investigations* 5079, Oct. 1954, 46 p. (TN21 Un3r)

Beneficiation and smelting of Pacific Northwest ore. Tables, graphs, micrographs, photographs.

2967* Beneficiation of Magnetite Ore Into a High-Percentage Concentrate and Its Further Processing Into Sponge Iron in Persberg (Central Sweden). **Aufbereitung von Magnetiterz zu hochprozentigem Konzentrat und dessen Weiterverarbeitung zu Eisenschwamm in Persberg (Mittelschweden).** (German.) Walter Lehnert. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 7, no. 10, Oct. 1954, p. 435-440.

Reasons of smelting for sponge iron; description of the Persberg and other sponge-iron plants; future prospects of sponge-iron production; and comparison of the Wiberg and Höganäs processes. Diagram, photographs, table. 11 ref.

See also:
1771 (production of BeO)
1992 (flotation of pitchblende)
2467 (ball mill grinding)
3015 (particle size analysis)

PHYSICS

2968 Heat Capacities at Low Temperatures and Entropies at 298.16° K. of Calcium and Magnesium Ferrites. E. G. King. *American Chemical Society, Journal*, v. 76, Nov. 20, 1954, p. 5849-5850.

Includes tables. 6 ref.

2969* Study of the Stability of Automatic Regulation of Thermal-Type Inertia Systems. **Étude sur la stabilité de la régulation automatique des systèmes a inertie du type thermique.** (French.) P.-L. Dubois-Violette. *Annales de physique*, v. 9, 12me Série, Sept.-Oct. 1954, p. 582-632.

Calculation of period of oscillation, sensitivity limit, and form of the regulating reaction. Diagrams, graphs. 15 ref.

2970* Study of Statistical Models Suggested by Considering the Effects of Atmospherics on Amplifiers. **Étude de modèles statistiques suggérés par la considération des effets des atmosphériques sur les amplificateurs.** (French.) André Blanc-Lapierre, Michel Savelli, and André Tortrat. *Annales des Télécommunications*, v. 9 ,no. 9, Sept. 1954, p. 237-245.

Applications of aleatory functions from a Poisson distribution. Graphs, charts, diagrams. 7 ref.

2971* A Derivation of Maxwell's Equations of the Vacuum With the Aid of the Energy-Quantum Model. **Eine Ableitung der Maxwellschen Gleichungen des Vakuums mit Hilfe eines Energiequantenmodells.** (German.) Harry Zuhrt. *Archiv der elektrischen Übertragung*, v. 8, no. 10, Oct. 1954, p. 447-456.

Develops a new mechanical model of carriers of an electromagnetic field. Diagrams.

2972 Some Properties of Symmetrical Slit ("Cylindrical") Electron Lenses. G. D. Archard. *British Journal of Applied Physics*, v. 5, Nov. 1954, p. 395-399.

Focal lengths were determined as a function of aperture size and applied potential. Diagram, graphs, table.

2973 The Two-Dimensional Electric Field of a Curved-Sided Wall or Groove on an Infinite Plane. N. H. Langton and N. Davy. *British Journal of Applied Physics*, v. 5, Nov. 1954, p. 405-410.

The electric or magnetic field of a two-dimensional system is investigated theoretically using conformal transformations and elliptic integrals. Diagrams, graphs, tables.

2974 Visualization (In Depth) of Ultrasonic Fields by Reduction of Boundary-Surface Energy. H. H. Rust and H. Drubba. *Henry Brutcher, Altadena, Calif., Translation no.* 3034, 4 p. (From *Kolloid Zeitschrift*, v. 127, no. 1, 1952, p. 38-39.)

Ultrasonic whirls at liquid-gas interphase boundaries. Photographs.

2975* On Linearly Polarized Electromagnetic Waves of Arbitrary Form. A. Nisbet and E. Wolf. *Cambridge Philosophical Society, Proceedings*, v. 50, Oct. 1954, p. 614-622.

Two simple laws connecting the amplitude and phase functions are derived. 7 ref.

2976 Chart for Getting Vapor Viscosities. A. I. Johnson, Chen-Jung Huang, and J. D. Kemp. *Chemical Engineering*, v. 61, Dec. 1954, p. 195-196.

Estimates based on vapor temperature, mol. wt., and critical temperature and pressure. Graphs, chart. 9 ref.

2977* Measurement of Spherical Shock Waves. Hubert Schardin. *Communications on Pure and Applied Mathematics*, v. 7, Feb. 1954, p. 223-243.

Theoretical and experimental results to furnish a basis for solving practical problems on blast effect. Graphs, table, photographs, diagrams. 33 ref.

2978* General Method of Approximation for Solving Diffraction Problems. **Sur une méthode générale d'approximation pour résoudre les problèmes de diffraction.** (French.) Maurice Jessel. *Comptes rendus*, v. 239, no. 13, Sept. 27, 1954, p. 753-756.

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Details of the experimental procedures, apparatus, and method of correcting for stray reflections. Diagrams, graphs, table. 5 ref.

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R. P. Hudson. *Journal of Research, National Bureau of Standards,* v. 53, Sept. 1954, p. 173-184.

Description, especially of the cryostat and the mutual-inductance bridge. Photographs, diagrams, circuit. 10 ref.

2993* The Weizsäcker-Type Inhomogeneity Correction of the Kinetic Energy Calculated by Statistical Method. **A statisztikus módszerrel számított kinetikus energia Weizsäcker-féle inhomogenitási korrekciójáról.** (Hungarian.) Pál Gombás. *Magyar Fizikai Folyóirat,* v. 2, no. 4, 1954, p. 279-295.

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Synchronization of self-vibrating systems by a small harmonic external force with a frequency close to the frequency of one of the overtones of the system. Diagram, graphs. 11 ref.

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Wave equations. Circuits. Components. Noise control. Human speech.

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Minimum modulus; exponential functions; uniqueness and growth theorems.

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3015 The Physics of Particle Size Analysis. 218 p. 1954. Institute of Physics, London. (TA407 P56)

Thirty-six papers on size separation, molecular phenomena, scattering and absorption of light, shape factors, visual counting and sizing of microscopic particles, and theory of photoelectronic machines for automatized counting and sizing.

3016 Quantum Mechanics. F. Mandl. 233 p. 1954. Academic Press, New York. (QC174.1 M31.2q)

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3018 Smithsonian Physical Tables. William Elmer Forsythe. 9th Rev. Ed. 827 p. 1954. The Smithsonian Institution, Washington, D. C. (QC61 Sm69s9)

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1976 (recombination luminescence)
2020 (superfluids)
2245 (transfer of heat and electricity in semiconductors)
2690 (magnetic properties of rare earths)
2877 (electroacoustics)
3070 (heat flow through plastics)

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Chemistry of modified systems. 6 ref.

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Experimental verification of calculations involved in deducing an equation of output. Graphs, diagrams, tables.

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Examples. Photographs.

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Glycol polyester plasticizers are used. Table.

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Matching and processing of fiber and resin.

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Molding properties of pre-impregnated plastic. Photographs, graphs, tables, diagram.

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A formula which makes it possible to calculate gate dimensions for injection molding. Photographs, diagram.

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3069* Weather Aging of Styrene and Phenolic Plastics. C. H. Adams and J. R. Taylor. *Rubber World*, v. 131, Nov. 1954, p. 239-243.

Unpigmented styrene most seriously degraded. Photograph, tables, graphs.

3070* Heat Flow Through Plastics Materials. Victor Paschkis. *SPE Journal*, v. 10, Nov. 1954, p. 28-30.

Problem is set up and solved by analog computation. Diagrams, circuits.

3071* Plastic Auto Body Development. William A. Hermonat. *SPE Journal*, v. 10, Nov. 1954, p. 31, 45.

Includes table.

3072* Plastic Tooling Comes of Age. Robert F. Parks. *Tool Engineer*, v. 33, Dec. 1954, p. 73-76.

Uses of plastics to supplement metals in dies, jigs, and fixtures. Photographs.

3073* Rigid and Semi Rigid PVC Insulations. J. L. Foster. *Wire and Wire Products*, v. 29, Nov. 1954, p. 1331-1333, 1369-1371.

Production, properties, and applications. Tables.

3074* Effects of γ Rays on Solid Acrylamide. **Die Einwirkung von γ-Strahlen auf festes Acrylamid.** (German.) Arnim Henglein and Rolf Schulz. *Zeitschrift für Naturforschung*, v. 9b, no. 9, Sept. 1954, p. 617-618.

Polymerizing effect of γ rays. 8 ref.

Books and Miscellaneous Publications

3075 Manual for Plastic Welding. v. II. Polyethylene. G. Haim and J. A. Neumann. Welding of Plastic Series. 128 p. 1954. The Industrial Book Co., Cleveland. (TP986 H12w)

Gas welding and its applications.

See also:
1723 (glass reinforced plastics)
1801 (plastics)
1870 (preparation of vinylacetylene)
2144 (dielectric breakdown of thermosetting laminates)
2427 (friction properties of nylon)
2464 (non-metallic gasket materials)
2519 (dental materials)

POLLUTION AND WASTES

3076* Portable Electrostatic Dust Sampler With Electronic Air Flow. D. G. Beadle, P. H. Kitto, and P. J. Blignaut. *Archives of Industrial Hygiene and Occupational Medicine*, v. 10, Nov. 1954, p. 381-389.

Design; characteristics; operating details. Diagrams, graphs, photographs. 5 ref.

3077* The Use of Radioactive Isotopes in Tracing Sewage Flow. G. A. Truesdale. *Atomics (British)*, v. 5, Nov. 1954, p. 304-312.

Includes photograph, graphs. 9 ref.

3078 Contribution of Management and Chemical Engineering to Process Waste Control. A. N. Heller and M. E. Wenger. *Chemical Engineering Progress*, v. 50, Nov. 1954, p. 546-551.

By-product recovery techniques for phenolic wastes and waste sulfite liquor. Photographs, tables, flowsheets.

3079* Processing of Several Waste Products From the Mineral-Oil Refineries of Czechoslovakia. **Über die Verarbeitung einiger Abfallprodukte aus Mineralölraffinerien der ČSR.** (German.) V. Štěpina. *Chemische Technik*, v. 6, no. 10, Oct. 1954, p. 540-545.

Methods of extracting useful components such as H_2SO_4, asphalt-like substances, and sulfo-acids from acid sludge. Flow charts, tables. (To be continued.)

3080 Photoelectric Apparatus for Assessing Dust Samples. D. G. Beadle. *Engineers' Digest*, v. 15, Oct. 1954, p. 428-430. (From *Journal of the Chemical, Metallurgical & Mining Society of South Africa*, v. 55, no. 2, Aug. 1954, p. 30-39.)

Basic theory, description, operation, calibration, and advantages of the apparatus. Graphs, diagram. 1 ref.

3081* Treatment of Waste Water From Coal Mining and Coal Processing. **Die Behandlung des Abwassers der Steinkohlengewinnung und -veredlung.** (German.) Günter Müller-Neuhaus. *Gas- und Wasserfach*, v. 95, Ausgabe Wasser, no. 18, Sept. 15, 1954, p. 573-579.

Methods of treating waste waters from coal mines, washeries, and coking plants. Tables, diagrams, photographs, graph. 14 ref.

3082 French Patent Solves Fume Problem in Oxygen Steelmaking. Pierre J. Leroy and L. Septier. *Journal of Metals*, v. 6, Nov. 1954, p. 1189-1191.

Equipment, operating procedure, and dust characteristics. Photograph, tables, micrographs. 3 ref.

3083 Water Supply From Sewage Effluent. E. B. McCormick and O. K. Wetzel, Jr. *Petroleum Refiner*, v. 33, Nov. 1954, p. 165-167.

First of a series on pollution control. How Cosden Petroleum Corp. has operated over the last 10 yr. Table, diagram.

3084* Aerodynamic Dust Collectors Team up With Pneumatic Ash Handling to Lick Air Pollution. L. F. O'Reilly, R. H. Mills, and W. J. Fadden, Jr. *Power*, v. 98, Nov. 1954, p. 73-77.

Design and operation of collector for refined separation of flyash particles from flue gas and two vacuum systems for flyash and bottom-ash handling. Photographs, diagram, table.

3085 Photosynthetic Reclamation of Organic Wastes. Harold B. Gotaas, William J. Oswald, and Harvey F. Ludwig. *Scientific Monthly*, v. 79, Dec. 1954, p. 368-378.

Interaction of bacteria and algae in sewage. Diagram, photographs, tables, graphs. 16 ref.

3086* Biological Reduction of Sodium Chlorate as Applied to Measurement of Sewage B.O.D. Edward H. Bryan and Gerard A. Rohlich. *Sewage and Industrial Wastes*, v. 26, Nov. 1954, p. 1315-1324.

Studies of possible use of $NaClO_3$ as a source of combined O in the B.O.D. test. Graphs, tables. 15 ref.

3087* Treatment of Machine Shop and Foundry Wastes. C. W. Hathaway and R. E. Harvie. *Sewage and Industrial Wastes*, v. 26, Nov. 1954, p. 1363-1369.

Equipment and techniques for disposing of metalworking oils and the black slurry resulting from the operation of a foundry sand reclamation system. Flowsheets, diagrams.

3088* Control of Accidental Discharge of Cyanide Solutions. B. A. Poole, R. H. Holtje, and W. G. Belter. *Sewage and Industrial Wastes*, v. 26, Nov. 1954, p. 1382-1387.

Measures to prevent accidental discharge of plating wastes into city sewage systems. Diagrams.

Pollution and Wastes

3089 Survey of Smoke Control. I-II. Roger A. Renwanz and Schaeffer E. Specht. *Steel*, v. 135, Nov. 22, 1954, p. 100, 102, 116; Nov. 29, 1954, p. 76-78.

Applications of precipitators in various metallurgical operations. Table, diagrams.

3090 Recommendations for the Disposal of Carbon-14 Wastes. *U. S. National Bureau of Standards, Handbook* 53, Oct. 26, 1953, 14 p. (QC100 Un3.5h)

Precautions to be taken in protecting the users and public, and bases for recommendations. Tables. 3 ref.

Books and Miscellaneous Publications

3091* Air Pollution; A Bibliography. S. J. Davenport and G. G. Morgis. 448 p. 1954. Bulletin 537, United States Bureau of Mines. United States Government Printing Office, Washington, D. C. (ZTD884 D27a)

See also:
1795 (evaporation of waste liquor)
1798 (use of peanut hulls as activated char)
1800 (waste water disposal)
1852 (estimation of ozone in air)
1853 (sewage analysis)
2170 (disposal of plating wastes)
2305 (SO_3 in flue gases)
2586 (elimination of cupola fumes)
2884 (radioactive air pollution)

RUBBER AND ELASTOMERS

3092* Diffusion of Antioxidants in Rubbers. **Diffuziia antioksidantov v kauchukakh.** (Russian.) A. S. Kuz'minskii, S. A. Reitlinger, and E. V. Shemastina. *Doklady Akademii Nauk SSSR*, v. 98, no. 4, Oct. 1, 1954, p. 611-612.

Temperature and time factors. Garphs. 3 ref.

3093* Kinetics of Crystallization of Rubber. W. J. Dunning. *Faraday Society, Transactions*, v. 50, Oct. 1954, p. 1115-1127.

Development in several rubbers at −2.0, −17.5, −26.0, and −36.0 C on basis of Russell's measurements. Graphs. 20 ref.

3094 Fundamental Low Temperature Retraction Studies of Natural and Synthetic Elastomers. Lee J. Radi and Norman G. Britt. *Industrial and Engineering Chemistry*, v. 46, Nov. 1954, p. 2439-2444.

Includes graphs, tables, photograph. 4 ref.

3095* Low Temperature Properties of Plasticised Butadiene-Styrene Copolymers. D. A. Henderson and L. A. McLeod. *Institution of the Rubber Industry, Transactions*, v. 30, Oct. 1954, p. 115-128.

Second order transition temperatures were measured by dilatometric techniques. Tables, graphs. 16 ref.

3096* Chlorination of Natural Rubber Solution by Means of Phenyl Iododichloride. C. S. Ramakrishnan, D. Raghunath, and J. B. Pande. *Institution of the Rubber Industry, Transactions*, v. 30, Oct. 1954, p. 129-137.

Includes tables, graph. 10 ref.

3097* How to Treat Tensile Data of Rubber. II. A Computational Method. Shigeo Kase. *Journal of Polymer Science*, v. 14, Nov. 1954, p. 497-501.

Based on frequency distributions. Method avoids graphic study. 3 ref.

3098* Measuring the Thermal Conductivity of Foam Rubber. **Messung der Wärmeleitfähigkeit von Schaumgummi.** (German.) Curt Hagen and Gerhard Pahl. *Kautschuk und Gummi*, v. 7, no. 10, Oct. 1954, p. 218WT-221WT.

Improved non-stationary heat-flow method of measuring and mathematical treatment of the measurements. Photographs, diagrams, graphs.

3099* Experiences With Silicone Rubber. **Erfahrungen mit Siliconkautschuk.** (German.) Manfred Wick and Wolfgang Dietz. *Kautschuk und Gummi*, v. 7, no. 10, Oct. 1954, p. 222WT-228WT.

Effect of type, particle size, and electrolyte content of fillers on the chemical, electrical, and mechanical properties of silicon rubber; methods of processing and uses of this type of rubber. Tables, photographs. 7 ref.

3100* The Production of Buna Mixtures Containing Oil and Carbon Black From "Igetex S3" Synthetic Latex. **Olaj és koromtartalmú bunás keverékek elöállítása Igetex S3 mülatexböl.** (Hungarian.) Zoltán Bruckner and Kovács Margit Juhászné. *Magyar Kémikusok Lapja*, v. 9, no. 10, Oct. 25, 1954, p. 289-294.

Hungarian experiments on discovering what domestic oil would substitute for the thermal decomposition process when mixed into synthetic latex, and what simple technology could be used to produce a homogeneous dispersion from synthetic latex, oil, and carbon black. Tables.

3101 Above 300 F—Fluoro-Acrylic Elastomers. Horace C. Hamlin. *Product Engineering*, v. 25, Nov. 1954, p. 161-163.

Properties of new rubber materials that remain flexible and stable in corrosive atmospheres. Photographs, tables, graph.

3102 How Firestone Uses Silicone Release Agents. D. R. Endres. *Rubber Age*, v. 76, Nov. 1954, p. 239-242.

Mold release compounds for rubber tires. Photographs.

3103 Electronic Elimination of Stray Metal in the Production of Synthetic Rubber. F. J. Sackfield and Ottmar W. Noeske. *Rubber Age*, v. 76, Nov. 1954, p. 243-246.

Description and operation of metal detector. Photographs, diagram.

3104 Bibliography of Butyl Rubber. E. E. McSweeney and W. J. Mueller. *Rubber Age*, v. 76, Nov. 1954, p. 247-252.

Listing of 378 references on preparation, properties, and uses. Includes subject index.

3105 Factors Influencing the Utility of Neoprene Solvent Adhesive Cements. Louis S. Bake. *Rubber Age*, v. 76, Nov. 1954, p. 253-256.

Studies of stability and adhesion properties. Tables.

3106 The Heat-Sensitization of Natural Rubber Latex. E. G. Cockbain. *Rubber Developments*, v. 7, Autumn 1954, p. 66-71.

Heat sensitization agents and methods. Photographs, tables.

3107* How Synthetic Rubbers Affect You. Ian D. Patterson. *Rubber World*, v. 131, Nov. 1954, p. 218-224, 238.

Present market; use of Olsen flow tester in selection. Graphs, tables, photograph. 15 ref.

3108* Vulcanization of the W Types of Neoprene Combinations of a Thiuram, a Guanidine, and Sulfur. R. M. Murray and D. C. Thompson. *Rubber World*, v. 131, Nov. 1954, p. 225-231.

Blending of accelerators for desired qualities. Tables, graph. 9 ref.

3109* Static and Dynamic Deformation Characteristics of Vulcanized Rubber and Other High Polymers. **Statische und dynamische Verformungseigenschaften von Kautschukvulkanisaten und anderen Hochpolymeren.** (German.) R. Ecker. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 20, no. 9, Sept. 1954, p. 291-304.

Complex modulus of elasticity; effects of temperature, rate of deformation, and stress condition on the mechanical and other properties of elastomers. Graphs, tables. 11 ref.

Books and Miscellaneous Publications

3110 Cabot Carbon Blacks Under the Electron Microscope. 2nd Ed. 99 p. 1950. Godfrey L. Cabot, Boston. (TP951 C11c2)

Particle size and properties of C blacks for rubbers and inks.

3111 Synthetic Rubber. G. S. Whitby, C. C. Davis, and R. F. Dunbrook, editors. 1044 p. 1954. John Wiley & Sons, New York. (TS1925 W58s)

Written under auspices of Division of Rubber Chemistry, ACS,

as a comprehensive review of our present state of knowledge by 38 workers in the field.

See also:
1801 (rubber)
1852 (estimation of ozone in air)
1869 (synthesis of trifluoromethylated butadienes)
1981 (polymerization studies)
3029 (isocyanate elastomers)
3061 (toxic effects of plasticizers)

SPACE HEATING AND CONDITIONING

3112 American Society of Heating and Ventilating Engineers, Transactions, (Annual Volume), v. 59, 1954, 568 p.

Twenty-nine papers on air flow and transfer, heat pumps, hot water and steam heating, panel heating and cooling, physiological research, insulation, sorption, sound and vibration control, and industrial applications.

3113 The Use of Semiconductors in Thermoelectric Refrigeration. H. J. Goldsmid and R. W. Douglas. *British Journal of Applied Physics,* v. 5, Nov. 1954, p. 386-390.

Theory. Development of a thermocouple consisting of Bi_2Te_3 and Bi, capable of maintaining 26 C of cooling. Graphs, diagrams. 13 ref.

3114 "Handbook" on High Velocity Air Distribution Design. C. Milton Wilson. *Heating, Piping & Air Conditioning,* v. 26, Nov. 1954, p. 94-108.

Fundamentals; sizing high velocity ducts; duct construction; dual duct hign velocity systems; design details; high temperature differential systems. Graphs, tables, diagrams, photographs.

3115 Capacity Control for Compressors. W. G. Wassmandorf. *Heating and Ventilating,* v. 51, Dec. 1954, p. 63-66.

Systems to vary the capacity of reciprocating compressors to suit operating conditions in refrigerators. Diagrams.

3116 Heating and Air Conditioning Systems Can Be Served by Lubricated Plug Valves. H. A. Alorfer. *Heating and Ventilating,* v. 51, Dec. 1954, p. 68-70.

Design, use and maintenance of lubricating plug valves for service in heating and air conditioning systems. Photographs.

Books and Miscellaneous Publications

3117 The Absorption Refrigerator. **Die Absorptionskältemaschine.** (German.) J. H. Dannies. 240 p. 1951. Brücke-Verlag Kurt Schmersow, Hannover, Germany. (TP492 D23a)

Principles and design of refrigerators using the principle of absorption. Use in air conditioning, space drying, and heating. Extraction of water from the atmosphere by solar energy.

TEXTILES AND FIBERS

3118 The Near Infra-Red Absorption Spectra of Natural and Synthetic Fibres. A. Elliott, W. E. Hanby, and B. R. Malcolm. *British Journal of Applied Physics,* v. 5, Nov. 1954, p. 377-381.

Methods of obtaining spectra. Information that can be obtained. Spectra. 24 ref.

3119 PVC in the Garment Trade. Materials and Markets. *British Plastics,* v. 27, Oct. 1954, p. 376-380.

Includes sample, table.

3120 Producing Textile Fibres From Proteins. Herschel S. Jenkins. *Canadian Chemical Processing,* v. 39, Oct. 1954, p. 82 + 5 pages.

Discusses zein (Vicara) fibers. Table, diagrams, micrographs, X-ray diffraction pattern. 16 ref.

3121 Textile Properties of the Synthetic Fibres. T. H. Morton. *Journal of Applied Chemistry,* v. 4, Oct. 1954, p. 525-538.

Screening of possible fibers to select materials of high textile utility. Tables, graph.

3122 The Soiling of Textile Materials. An Account of the General Problem With Some Observations. W. Howard Rees. *Textile Institute, Journal (Proceedings),* v. 45, Oct. 1954, p. P612-P631.

Factors affecting the susceptibility of textile materials to soil during manufacture and in use. Photographs, tables, graphs. 13 ref.

3123 Measurement of Hardness of Textile Fibres. I. Jute. A. C. Chakravarty. *Textile Institute, Journal (Transactions),* v. 45, Oct. 1954, p. T723-T729.

Instrument and method for studying the elastic response of three varieties of jute fibers. Diagram, tables.

Books and Miscellaneous Publications

3124 The Physical Chemistry of Dyeing. Thomas Vickerstaff. 2nd Rev. Ed. 514 p. 1954. Interscience Publishers, New York. (TP893 V66p2)

Original work was done in 1946; kinetics of dyeing has been rewritten and chapters on vat dyeing and synthetic fiber treatment have been added. This approach is the author's own and all equations are derived from first principles.

See also:
1801 (textiles)

WELDING AND JOINING

3125 Mechanization of Argon-Arc Welding. J. P. Crum. *Aircraft Engineering,* v. 26, Oct. 1954, p. 360-364, 366.

Experience with inert-gas-shielded arc welding of light alloys. Photographs, table, diagrams.

3126 The Riveting of Aluminium. *Aluminium Development Association, Information Bulletin No.* 8, Sept. 1954, 62 p. (TS550 A82i)

Design factors for riveted joints, manufacture of rivets, riveting techniques. Tables, diagrams, photographs. 20 ref.

3127 Welding for Fabrication. D. C. Martin. *Battelle Technical Review,* v. 3, Dec. 1954, p. 125-128.

Advantages of gas-shielded-arc welding. Improvements in welding electrodes. Present and future applications of welding. Photographs.

3128 The Glass Sealing Properties of Titanium and Zirconium. H. Rawson and E. P. Denton. *British Journal of Applied Physics,* v. 5, Oct. 1954, p. 352-353.

Thermal expansion characteristics; sealing techniques; strength of seals. Photograph, graphs, diagrams.

3129 Trends in Modern Shipyard Welding. R. J. W. Rudkin. *British Welding Journal,* v. 1, Nov. 1954, p. 487-494.

Structural design, edge preparation, comparison of machine and hand welding, quality control, prevention of failures, and cost reduction. Diagrams, photographs, tables, graphs. 2 ref.

3130 Welding in the Aero-Engine Industry. F. G. C. Sandiford. *British Welding Journal,* v. 1, Nov. 1954, p. 495-504.

Organization of production, special equipment, and new methods. Diagrams, photographs.

3131 Fusion Welding of Aluminium Alloys. IV. Preliminary Tests on High-Strength Heat-Treatable Aluminium Alloys. W. G. Hull and D. F. Adams. *British Welding Journal,* v. 1, Nov. 1954, p. 513-521.

Details of testing program. Welding characteristics of Al-Cu alloys. Tables, photographs, graph. 5 ref.

3132 Push Button Pipe Welding With an Automatic Hidden-Arc Technique. E. E. Walden. *Canadian Metals,* v. 12, Nov. 1954, p. 56, 58, 60.

Machine achieves greater penetration, higher quality, and better appearance without glare or fumes. Savings of up to 70% of time for manual welding.

3133* Automatic Percussion Welding. A. L. Quinlan. *Communication and Electronics,* 1954, Nov., p. 561-565.

Description of welding equipment. Advantages of process. Electrical circuits. Photographs, diagrams, graphs.

Welding and Joining

3134* **Carbon Arc. Welding of Copper.** *Industry and Welding*, v. 27, Dec. 1954, p. 58-63.

Proper welding techniques, joint preparation, and metallurgical changes. Tables.

3135* New Type of Glue for Fastening Sheet Polyisobutylene to Metal. **Novyi tip kleia dlia krepleniia listovogo poliizobutilena k metallu.** (Russian.) A. P. Pisarenko and R. A. Reznikova. *Legkaia Promyshlennost'*, v. 14, no. 10, Oct. 1954, p. 23-26.

Compositions; strength, and other properties of glues. Tables, graphs.

3136 Adhesive Bonding. George Epstein. *Machine Design*, v. 26, Nov. 1954, p. 217-220.

Bonding procedure, advantages and conditions for joining metals and plastics. Photographs.

3137 Adhesive Bonding. Helmut Thielsch. *Materials & Methods*, v. 40, Nov. 1954, p. 113-128.

Types of bonding agents, properties and how they can be altered, applications, and manufacturers. Photographs, tables, graphs, diagram.

3138* Spot Welding of a Heavy Armature. **Tochechnaia svarka tiazheloi armatury.** (Russian.) S. S. Levi. *Mekhanizatsiia Stroitel'stva*, v. 11, no. 10, Oct. 1954, p. 5-9.

Welding procedures. Size and strength of weld. Tables, graphs, photograph.

3139 The British Welding Research Association. K. Winterton. *Metallurgia*, v. 50, no. 300, Oct. 1954, p. 169-174.

Survey of more important aspects of current work. Photographs.

3140* A New Production Brazing Process. C. A. McFadden. *Modern Metals*, v. 10, Nov. 1954, p. 57-59.

Method of brazing Al sheathed nichrome heating elements to Al cooking utensils gives 400% increase in heating efficiency. Photographs.

3141* Print—Roll—Inflate. *Modern Metals*, v. 10, Nov. 1954, p. 86, 88.

New roll-bonding process creates maze of tubing from two sheets of Al. Photographs, micrograph.

3142 Metal-Bonding Adhesives With Improved Heat Resistance. John M. Black and R. F. Blomquist. *Modern Plastics*, v. 32, Dec. 1954, p. 139 + 4 pages.

Progress report on development of adhesives with greater resistance to temperatures up to 600 F. Tables. 7 ref.

3143* Physical Laws of Spot Welding Steel Sheets. **Physikalische Gesetzmässigkeiten bei der Punktschweissung von Stahlblechen.** (German.) A. Matting and E. Rubo. *Schweissen und Schneiden*, v. 6, no. 9, Sept. 1954, p. 365-370.

Limitations of mathematical and physical analyses for determining optimum conditions. Functional relations of various factors. Micrograph, diagram, graph. 6 ref.

3144* Residual Stresses in Built-Up Cylindrical Elements. **Eigenspannungen durch Auftragschweissung in zylindrischen Werkstücken.** (German.) Hans Bühler. *Schweissen und Schneiden*, v. 6, no. 9, Sept. 1954, p. 370-372.

Compositions and mechanical properties of investigated steels; determination of internal stresses by drilling and changes in length and diameter. Tables, graphs. 11 ref.

3145* Welding of Large Clad Steel Containers. **Schweissen von Grossraumbehältern aus plattierten Blechen.** (German.) M. Komers. *Schweissen und Schneiden*, v. 6, no. 9, Sept. 1954, p. 374-379.

Assembly, welding, control, and heat treating of oil refinery structures. Photographs, diagrams, micrograph. 3 ref.

3146* Advances in the Field of Welding and Cutting. Important Recent Publications on Electric-Arc Welding Processes. **Fortschritte auf dem Gebiete des Schweissens und Schneidens.** (German.) J. Ruge. *Schweissen und Schneiden*, v. 6, no. 9, Sept. 1954, p. 380-383.

Critical review. Tables. 80 ref.

3147* Economy of High Efficiency Electrodes. **Wirtschaftlichkeit von Hochleistungselektroden.** (German.) Hans Hülsewig. *Schweissen und Schneiden*, v. 6, no. 10, Oct. 1954, p. 400-410.

Description, melting rate, costs, and mechanical properties of weld metal. Graphs, diagrams, tables, photographs. 6 ref.

3148 The Importance of Design in Welding. H. Gerbeaux. *Sheet Metal Industries*, v. 31, no. 331, Nov. 1954, p. 933-938.

Principles of design of welded structures. Diagrams. (To be continued.)

3149* Describing the Chemical Character of Silicate Melts, Especially of Powders for Welding With the Submerged Electric Arc. **Zur Kennzeichnung des chemischen Charakters silikatischer Schmelzflüsse, in Sonderheit von Pulvern zum Schweissen mit verdecktem Lichtbogen.** (German.) Paul Beyersdorfer. *Silikattechnik*, v. 5, no. 9, Sept. 1954, p. 381-384.

Studies of various powders, fluxes, and coatings for submerged-arc welding. Table. 6 ref.

3150* Applications of Welding Processes in the Construction of French Railway Rolling Stock. **Applications des procédés de soudage dans la construction française de matériel roulant de chemin de fer.** (French.) P. Salmon. *Soudure et Techniques connexes*, v. 8, nos. 9-10, Sept.-Oct. 1954, p. 251-272.

Methods and equipment for welding heavy sections. Diagrams, photographs.

3151* Consumable-Electrode Arc Welding of Stainless Steels in a Medium of Inert Gases. **Dugovaia svarka nerzhaveiushchikh stalei plaviashchimsia elektrodom v srede inertnykh gasov.** (Russian.) A. V. Petrov. *Vestnik Mashinostroeniia*, v. 34, no. 9, Sept. 1954, p. 68-70.

Study of welding in argon and helium and properties of the welds obtained. Diagram, photographs, table.

3152* Apparatus for Automatic and Semiautomatic Welding of the Institute of Electric Welding Named for Academician E. O. Paton of the Academy of Sciences of the Ukrainian SSR. **Apparatura dlia aotamaticheskoi i poluavtomaticheskoi svarki Instituta elektrosvarki imeni akad. E. O. Patona An USSR.** (Russian.) B. E. Paton and P. I. Sevbo. *Vestnik Mashinostroeniia*, v. 34, no. 10, Oct. 1954, p. 36-43.

Construction of various automatic welding apparatus; characteristic types of automatic and semiautomatic welding equipment. Photographs, sketch.

3153 Metallurgical Principles of Metal Bonding. M. S. Burton. *Welding Journal*, v. 33, Nov. 1954, p. 1051-1057.

Fundamentals of soldering, brazing, and welding. Diagrams, micrographs, photograph.

3154 Spot Welding Aluminum Alloys With Single-Phase Equipment. J. F. Harris. *Welding Journal*, v. 33, Nov. 1954, p. 1058-1072.

Basic schedule data using a shaped wave form for 12 variations of size and composition. Tables, photographs, graphs, micrographs.

3155 Improved Semi-Automatic Welding and Hard Facing. Howard S. Avery, Turner G. Brashear, Jr., Henry J. Chapin, and Gerald H. Edmunds. *Welding Journal*, v. 33, Nov. 1954, p. 1073-1079.

New device combines advantages of automatic with flexibility of manual welding. Photographs, diagram, tables, graph. 4 ref.

3156 Shielded-Inert-Gas Metal-Arc Welding of Carbon Steel. J. R. Craig. *Welding Journal*, v. 33, Nov. 1954, p. 1080-1086.

Application data for successful procedures. Photographs, tables, diagrams.

3157 High-Temperature Alloy Fusion Brazing for Titanium and Titanium Alloys. Roger A. Long and Robert R.

Ruppender. *Welding Journal*, v. 33, Nov. 1954, p. 1087-1090.

A Ti-Ni-Cu-Co alloy for furnace brazing Ti. Graphs, photograph, micrograph. 5 ref.

3158 Investigation of Factors Determining the Tensile Strength of Brazed Joints. Nikolajs Bredzs. *Welding Journal*, v. 33, Nov. 1954, p. 545S-563S.

Plastic constraint and strength of base metal are primary factors in strength of properly made brazed joints. Effects of gas inclusions and interface imperfections. Graphs, diagrams, photographs, tables. 15 ref.

3159 Local Buckling of Intermittently Welded Structural Members. C. H. Norris and J. B. Scalzi. *Welding Journal*, v. 33, Nov. 1954, p. 564S-578S.

Test results indicate critical gap-width ratios should be incorporated in specifications. Intermittent welding should not be used in dynamically loaded members. Diagrams, graphs, tables, photographs. 6 ref.

3160 Welded Steelwork for a New Highway Bridge. Alan Heathcote. *Welding and Metal Fabrication*, v. 22, Nov. 1954, p. 408-415.

Welding techniques and sequences. Photographs, diagrams.

3161 Mechanization of Argon Arc Welding. *Welding and Metal Fabrication*, v. 22, Nov. 1954, p. 424-429.

Practices for welding Al plate. Photographs, diagrams, tables.

3162* Technology of Protective-Gas Welding With Consumable Electrode (Sigma Welding). **Zur Technologie der Schutzgas-Schweissung mit abschmelzender Elektrode (Sigma-Schweissung).** (German and French.) Hans Schwarz. *Zeitschrift für Schweisstechnik*, v. 44, no. 10, Oct. 1954, p. 199-212.

Use of inert gases for welding Al and its alloys, Cu and its alloys, and stainless and carbon steels; economy of the process. Photographs, graphs, diagram. 4 ref.

3163* Phenomena of Diffusion During Welding. **Über Diffusionsvorgänge in der Schweisstechnik.** (German and French.) Carl G. Keel. *Zeitschrift für Schweisstechnik*, v. 44, no. 10, Oct. 1954, p. 212-217.

Reactions between solid and liquid phases and between metals and gases; diffusion in molten alloys. Micrographs, graph. 8 ref.

3164* Welding With Low Heat Consumption. **Die Schweissung bei geringem Wärmebedarf.** (German.) G. M. Blanc. *Zeitschrift für Schweisstechnik*, v. 44, no. 10, Oct. 1954, p. 217-220.

Techniques and advantages of low-temperature gas and electric welding based on the alloying of the base metal with the weld-rod metal by diffusion. Micrographs, graph, photographs.

Books and Miscellaneous Publications

3165* Literature Survey on Weld-Metal Cracking. A. J. Williams, P. J. Rieppel, and C. B. Voldrich. Report no. PB111285. 200 p. Aug. 1954. Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C. (TS227 B32L)

Cracking of high-strength welds was found to be related to hot tearing, hot shortness, blue brittleness, and hydrogen embrittlement.

See also:
2120 (welding of wires)
2500 (welding of Al)
2608 (welding of castings)
2623 (welding of stainless steels)
2645 (influence of Mn in welds)
2673 (residual stresses in welds)
2737 (welding of steel shapes)

WOOD AND FOREST PRODUCTS

3166* Sulfate Compounds Formed During Sulfate Cooking of Cellulose. **Sernistye soedineniia pri sul'fatnoi varke tselliulozy.** (Russian.) B. D. Bogomolov. *Bumazhnaia Promyshlennost'*, v. 29, no. 8, Aug. 1954, p. 6-10.

Elimination of odor of sulfate pulping by determining yield of sulfate compounds and studying its dependence on temperature of cooking. Graphs, tables, diagram. 6 ref.

3167* Influence of Jolting of Grid Table on Uniformity of Distribution of Fibers in Paper. **Vliianie triaski setochnogo stola na ravnomernost' raspredeleniia volokon v bumage.** (Russian.) I. D. Kugushev. *Bumazhnaia Promyshlennost'*, v. 29, no. 8, Aug. 1954, p. 14-18.

Theoretical and experimental study of factors influencing fiber arrangements. Graphs, table, diagram. 8 ref.

3168* Morphological Structure of Fiber. **O morfologicheskoi strukture volokon.** (Russian.) F. P. Komarov. *Bumazhnaia Promyshlennost'*, v. 29, no. 9, Sept. 1954, p. 5-8.

Structure of unbleached sulfite pulp. Diagram, micrographs. 7 ref.

3169* New Methods of Sizing Paper and Cardboard. **Novye metody prokleiki bumagi i kartona.** (Russian.) V. I. Mudrik. *Bumazhnaia Promyshlennost'*, v. 29, no. 10, Oct. 1954, p. 11-14.

Surface sizing with resinous, paraffinic and mixed dispersions. Sizing in the pulp stage. Tables, diagrams. 5 ref.

3170* Precipitation of Sulphite Waste Liquor With Caustic Lime at High Temperatures. Theodor N. Kleinert. *Pulp & Paper*, v. 55, Nov. 1954, p. 120-124.

Procedure for recovery of organic substances. Graphs, tables. 17 ref.

3171* The Chemical Nature of the Lignin of Douglas-Fir Bark. E. F. Kurth and James E. Smith. *Pulp & Paper*, v. 55, Nov. 1954, p. 125-132.

Determination of properties of lignin fractions. Tables, chromatograms. 17 ref.

3172* Flocculation, Formation and Headbox Design From the Aspect of Turbulent Motion. I. A Review of Work to Date in This Field. II. An Introductory Explanation of the Principles of Turbulent Motion and Considerations of Various Headbox Designs. III. The Slice. J. Mardon and W. Van der Meer. *Pulp and Paper Magazine of Canada*, v. 55, Oct. 1954, p. 107-127.

Includes diagrams. 75 ref.

3173* Studies in the Fundamentals of Wet-Web Strength. L. M. Lyne and W. Gallay. *Pulp and Paper Magazine of Canada*, v. 55, Oct. 1954, p. 128-134.

Relates physical properties to wet web strength. Graphs. 3 ref.

3174* Thunder Bay Nursery Management. E. M. Cressman. *Pulp and Paper Magazine of Canada*, v. 55, Oct. 1954, p. 153-154, 156.

Annual cycle of operations. Notes lack of research.

Books and Miscellaneous Publications

3175 Cellulose and Cellulose Derivatives. Emil Ott, Harold M. Spurlin, and Mildred W. Grafflin, editors. v. V. Pt. II. of High Polymers. 2nd Rev. Ed. 545 p. 1954. Interscience Publishers, New York. (QD321 Ot8c2)

Preparation from natural sources; bleaching and purification of wood cellulose; properties and treatment of pulp for paper.

See also:
1801 (wood)
1904 (oxidation of lignin)
2107 (corrosion in pulping equipment)